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ABSTRACT

This study sought to determine the extent to which teacher education programs were addressing the realities of teaching tasks that will be faced by their students who are training to teach vocational education in secondary schools in Zimbabwe. Students and lecturers from two schools of education responded to questionnaires, interviews, and workshop check-lists, providing data for the study. Based upon the analysis of data obtained, twenty conclusions were drawn, e.g., student teachers received enough preparation for their teaching tasks but there was some change of attitude evidenced as they progressed in the program as to the relevance of what they were learning. While some of the conclusions were consistent with those of findings of similar studies, several were not. Apart from comparing and contrasting the conclusions to the findings of similar studies, theories and arguments put forward by other authors and researchers are used to support the conclusions. The instruments used in the study, syllabi of technical subject courses at one university in Zimbabwe, and charts displaying findings are appended. (JD).

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A study of teacher education and the training of technical subject teachers in Zimbabwe

Peter Kwaira

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LINKÖPING UNIVERSITY
Department of Education and Psychology
RAPPORT I U P E K R 137

**A STUDY OF TEACHER EDUCATION AND THE
TRAINING OF TECHNICAL SUBJECT TEACHERS
IN ZIMBABWE**

Peter Kwaira

DISSERTATION

submitted as partial fulfilment for an
MA DEGREE IN METALWORK EDUCATION

LINKÖPING UNIVERSITY
Department of Education and Psychology
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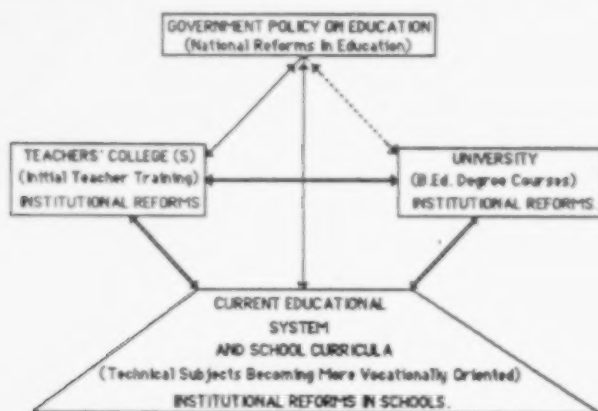
ERRATA

Changes are underlined

- Abstract, last paragraph, line 1: Based upon the analysis of data . . .
- Acknowledgements, paragraph 2, line 8: . . . serving teachers on the B.Ed. program (Technical Subjects) . . .
paragraph 3, Line 5: . . . the Zimbabwean High Commissioner to . . .
paragraph 3, line 9: . . . Dr. Nyagura and Dr. Chikombah of the . . .
- Contents page, METHODOLOGY, heading 3.07: . . . Workshop Check-Lists.
RESULTS And FINDINGS, heading 4.04 : The Number Of Workshop Check-Lists Completed.
- Page 11, Abbreviations, SIDA: Swedish International Development Authority.
- Page 13, Figure 1: The 'Cross-Model' of the relationships between an educational policy and the various institutions of Education in Zimbabwe.
- Page 21, heading 1.03, paragraph 2, line 3: . . . Ministry of Higher Education . . .
- Page 31, heading 2.03, Line 11: . . . needs of society. So, individuals . . .
- Page 52, heading 3.12: The time schedule.
- Page 56, heading 4.05: Answers to the nine secondary research questions.
- Page 58, paragraph 2, line 1: Measure (iv). For the university, getting . . .
paragraph 3, line 1: Measure (v). On the issues . . .
research question 3, paragraph 1, line 7: (see Literature Review)

- Page 90, paragraph 2, line 4: (see Figure 23, Appendix (xix) d.)
- Page 97, paragraph 11, line 1: No formal links existed between ...
- Page 110, paragraph 2, line 3: ... has brought a new ...
- Page 111, heading 5.03, conclusion 3, line 4: ... recommended that a larger group of lecturers be included ...

The correct version of Figure 1 on page 31, 'Cross-Model':



NOTE: The broken arrow between University and Government Policy On Education shows that Government does not have direct control on the University although in some cases the two are known to work together.



Avdelning, institution, fakultet
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The purpose of the study was 'to determine the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more vocationally oriented.'

The study was of two institutions of higher education; Belvedere Teachers' College, and the University of Zimbabwe. The case study method was found most suitable.

The instruments included; questionnaires, interview schedules and workshop check-lists. Data were collected in about two months.

The sample consisted of students and lecturers. Two officers from the Curriculum Development Unit (C.D.U.) were also included. Data were analysed both quantitatively and qualitatively.

Results were based on; questionnaire return rate, number of interview schedules completed, documents collected and the number of workshop check-lists completed. Findings were presented as they related to the nine secondary research questions addressed by this study.

Based upon the analysis data obtained through questionnaires, interviews, workshop check-lists and documents, twenty conclusions were drawn. While some of the conclusions were consistent with those of the findings of other similar studies, as reflected in the review of literature, several were not. Apart from comparing and contrasting the conclusions to the findings of other similar studies, theories and arguments put forward by other authors and researchers were also used to support the conclusions.

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FOREWORD

This Master of Arts dissertation was prepared within the framework of a bilateral cooperation project between Sweden and Zimbabwe. The Swedish International Development Authority - SIDA - provided financial support for the project.

Linköping University has been responsible for the education in cooperation with the University of Gothenburg. Fifteen students participated in the programme. Three students completed the main part of their education at University of Gothenburg. Twelve students completed their education at Linköping University.

For the twelve Linköping University students, the Department of Crafts and Design held the major responsibility for the courses. The exceptions being the course in research methodology and the actual preparation of the dissertations where the Department of Education and Psychology was responsible. Facilities for the fieldwork were provided by the University of Zimbabwe.

The Department of Crafts and Design has been the host department and responsible for the administration and coordination of the programme.

Linköping May 16, 1989

Bengt Wetterstrand
Head of Department
Dept of Crafts and Design

Lars Owe Dahlgren
Professor and Examiner
Dept of Education and Psychology

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I wish to dedicate this work to my late mother, Margarrett Mhurai; who, apart from being a devoted student, also loved all the children of ZIMBABWE.

Peter Kwaira
Linköping May, 1989

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ABBREVIATIONS

C.D.U.:	Curriculum Development Unit
B.T.C.:	Belvedere Teachers' College
U.Z.:	University Of Zimbabwe
B.Ed.:	Bachelor Of Education
TERC.:	Teacher Education Review Committee
Z.N.C.C.:	Zimbabwe National Craft Certificate
C.D.T.:	Craft Design and Technology
SIDA.:	Swedish International Development Agency
G.T.C.:	Gweru Teachers' College
T.P.:	Teaching Practice
Z.J.C.:	Zimbabwe Junior Certificate
OECD.:	Organization for Economic Co-Operation and Development

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1. INTRODUCTION

In today's world of continuous change, there is hardly any country with a stagnant educational system. For example, changes in the politico-socio-economic situation in a particular country might force it to make adjustments to its educational system. These adjustments are normally meant to make the educational system more suitable to the prevailing conditions. Particular conditions in society are likely to determine the existence of particular realities in the educational system, especially in schools and other related levels.

1.01 Statement of the problem

According to the TERC Report of 1986, since independence, Zimbabwe has been characterised by rapid and significant expansion of education at all levels; primary, secondary and tertiary. Already, critical and important questions have been raised regarding the degree of excellence of the educational efforts in our institutions.

If educational systems were to be judged solely by the size of student enrolment, the question of a crisis in the content and quality of these systems would not arise (Coombs, 1968). But, if people agree, as is most likely, that educational systems exist to teach students, not to produce statistics, then, in judging the content and quality of systems, we must ask: "What have the students actually been learning? How much have they learned, how well and how fast?" The quality and efficiency of a school may be high according to its own internal standards. But if its teaching, judged by external criteria, is obsolete and/or irrelevant for its place and time, then its quality and efficiency must be considered poor. (Coombs, *ibid.*)

Dissatisfaction with existing educational practices and results is the most powerful reason for changing (Hanson and Brembeck, 1966). From the same position, Hanson and Brembeck assert; as society changes at an evermore rapid pace from the industrial society of yesterday to the service society of today and tomorrow, it is certain that the public will expect more services from the educational enterprise. This actually means

that, its (society) concerns about who provides the services will increase accordingly. This is likely to result in the system becoming more rather than less complex.

Among the various problems which all countries have to face in connection with their educational systems, one of the most difficult and currently unresolved concerns curriculum design and the corresponding system of teacher training (Razik, 1972). According to Razik, the validity of any educational system naturally depends upon the quality of the teaching and availability of competent teachers. He also maintains that, whatever curriculum is adopted, there must be some means of putting it into effect. Therefore, it could equally be concluded; the failure of educational institutions to fully meet the expectations which society plans on them reflects crisis in means as well as in ends.

In fact, experience in most countries has proved that the problem of teacher supply is not one of simple numbers. It is first and foremost a problem of quality; getting a large enough quantity of the right quality. As one educationist puts it;

We can usually find enough willing bodies to keep order in the classroom. Our problem is to find enough who can also teach.
(Coombs, op cit, p. 34)

Now, given the context of Zimbabwe, where there has been a move to vocationalize the teaching of technical subjects, the problem appears to be a pressing need to study and gain an understanding of, 'the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more and more vocationally oriented'.

Implicit in this crucial task is the necessity of defining the new roles and goals for those involved in the preparation of teachers.

1.02 Purpose of the study

After identifying the problem, the purpose of this study was, 'to determine the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more vocationally oriented.'

Actually, this implies the analysis of curricula and programs within those institutions responsible for the training of technical-subject teachers in Zimbabwe.

1.03 Significance of the study

Designed to save the purpose already stated, this study will be significant in several respects. In the first place, it will contribute to general knowledge about teacher training in Zimbabwe. At the moment, very little is known about how innovations are introduced to teacher training, and the extent to which the institutions responsible for preparing teachers are themselves innovating agencies. In fact, a review of literature revealed that, to speak of 'innovation' as a unitary concept is misleading! Since there are clearly several stages involved in the process; the problem is to locate the points at which institutions of teacher education/training make their contribution.

Secondly, having been evolved through a curriculum and program analysis, mainly focused on curriculum design and teacher training, the study will be useful to the Ministry of Education, Curriculum Development Unit and to everyone concerned with educational planning. And, while concentrating on the training of technical-subject teachers, in the institutions under study, it may also be instrumental to teacher trainers and educators in other subject areas in any other teacher training institution.

Lastly, but not least, it is also hoped this study will interest serving teachers by bringing to light the demands placed on them now when society is undergoing a process of rapid change; socially, technologically and in other ways. This will also create an awareness in them, of the importance of their role as implementers of the educational reforms that affect or influence curricula; both at national and school levels.

1.04 The main objective of study

The research problem, stated at the beginning of this chapter, draws one's attention to the 'Cross Model', as presented within the literature review in the next chapter. This model reflects the two-way relationship between the tertiary institutions preparing teachers and the schools being mainly based

on curricula. Curriculum in either group of institutions has a bearing on that in the other. This is the 'Cross Model'.

That being the case, it therefore follows that the main objective of this study was to analyse the following curricula;

- (i) the national curriculum, as designed for schools. (with specific reference to technical subjects)
- (ii) the college and university curricula, as designed for the training of technical-subject teachers.

Such an analysis would include those aspects being covered within particular subject areas, and the time allocation. The capacity of workshops in institutions engaged in teacher training was also considered in terms of facilities; particularly equipment.

1.05 The primary research question

The primary research question answered by this study was: 'To what extent are the current teacher training programs in tertiary institutions being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more vocationally oriented?'

1.06 Secondary research questions

Linked to the main or primary research question, are the following secondary research questions:

1. What measures or steps have so far been taken, or are being taken by the institutions involved in the training of technical-subject teachers to gear their programs towards the present secondary school curricula?
- 2.(i) If anything has been done or is being done, what difficulties have been, are being or could be faced in the process? (ii) And if there are any problems already existing or anticipated, what efforts have been made or are being made either to solve or to prevent them?

3.(i) Is there or has there been a need to upgrade staff already in service?
 (ii) If so, what efforts have been or are being made to meet the need?

4.(i) If anything is being done or has been done to meet the need, what problems have been, are being, or could be faced in the process and what are or could be possible solutions? (ii) And, where particular solutions could have been tried in solving certain problems, what has been the outcome?

5. To what extent have activities at C.D.U., B.T.C. and U.Z. been limited, regarding the development of curricula and the training of technical-subject teachers?

6. What are the views of student teachers undergoing initial teacher training, regarding the nature and value or relevance of the preparation they have in college before going into schools?

7. What are the views of the serving teachers on the B.Ed. program at the university, regarding the nature and value or relevance of the course or courses they are undergoing?

8. What are the views of lecturers at Belvedere regarding certain elements of the Zimbabwean educational system, the capacity of their workshops, the nature and value or relevance of the courses they are involved in and so on?

9. What are the views of lecturers at the university regarding certain elements of the Zimbabwean Educational System, the capacity of their workshops, the nature and value or relevance of the courses they are involved in and so on?

1.07 Definition of terms

1. **Initial teacher training** Pre-service teacher training in a teachers' college.
2. **Serving teacher** A qualified teacher undergoing or attending an in-service course to raise his/her level of qualification.
3. **Teaching practice** Done by a student teacher as part of his/her training before becoming a fully qualified teacher.

4. **Technical subjects** The type of subjects taken under technical education; for example, Metalwork.
5. **Curriculum** A course of studies in one subject at a school or college. Or, a description of all the subjects or courses offered by a school or college.
6. **Student-teacher** One attending a teachers' college, learning to become a teacher.
7. **Peer-group teaching** A kind of simulation where one presents a lesson in front of fellow students and lecturers for practice.
8. **Observation period** A period during which student teachers go into schools, not to teach, but to acquaint themselves with the various school activities.
9. **View** One's opinion of something. Sometimes, this also refers to one's attitude(s) towards something.
10. **Trade test** the kind of test used to determine or check on one's technical skills. (technical abilities)
11. **Journeyman** One who qualifies as a skilled tradesman with a certain level of trade grading.
12. **Curriculum development** Systematic process of building curriculum for a particular stage of education or institution, involving setting out aims, content, methods and evaluation procedures.
13. **Allied theory** The kind of theory that goes together with a practical lesson sometimes also referred to as 'ancillary theory'.
14. **Co-ordination** Bringing different undertakings (e.g. programs) into functional relationship.
15. **Educational innovation** Changes in objectives, content or methods usually initiated in experimental situations.
16. **Educational policy** An official statement of goals to which the system of education is directed.
17. **Educational reform** Change planned or in process of implementation relating to a major part of the national system of education.

18. **Higher education** Stage following secondary education regardless of course duration or certificates awarded. Normally takes place in college or university.
19. **In-service education** Courses or programs providing sustained further study enabling professional persons to improve their qualification.
20. **In-service teacher education** Designed to enable teachers to be retrained, or to obtain a higher level certificate, or even be initially trained when already in the field.
21. **Pilot school** A school where new ideas are tried.
22. **Polytechnical education** Part of general education program providing knowledge about main branches and scientific principles of production and equipping with basic practical skills necessary for participation in productive labour.
23. **Teaching methods** Patterns of teacher behaviour that are recurrent, applicable to various subject matters, characteristic of more than one teacher and relevant to learning.
24. **Technical education** Formal education designed to provide knowledge and skills underlying production processes with a wider connotation than vocational education at secondary or higher level.
25. **Vocational education** Formal education designed to prepare for skilled occupations in industry, agriculture and commerce, generally at secondary level.
26. **Vocational guidance** Help given to the individual inside or outside the school system in choosing a career or occupation.
27. **Vocational secondary schools** Secondary schools in which vocational education is offered.
28. **Co-operating teacher** A qualified teacher who assists a student teacher on teaching practice. Also referred to as a 'master teacher'.

2. THE REVIEW OF RELATED LITERATURE

The purpose of this chapter is to present a review of the literature relating to this study. With the assistance of the Reference Department of the library system at the University of Linköping, a computer search of the literature was conducted to identify relevant articles, research reports and books. The search for articles and research reports was restricted to those published since 1980, while that for books was restricted to those published since 1960 with the exception of Galkin's 1959 publication. Additional sources were identified by reviewing the reference list of material secured through the computer search.

2.01 Conceptual framework

To put this study into the appropriate conceptual framework, one is obliged to bring 'Teacher-education' and 'Teacher-training', terms appearing throughout this study, into context. Of particular interest, from a philosophical point of view, is the fact that the key terms; 'Education' and 'Training', are conceptually different.

According to Peters (1973), 'Education' is not an activity, and in his words;

We do not say, 'go along, go and get on with your educating,' as we would say, 'go along, go and get on with your teaching . . .' (p.15)

From the same place, it is affirmed; 'education' is no more an activity than 'reforming' and 'improving' are. Hence, the question; 'what is it then?'

'Education' like 'reform', is not a concept for picking out any specific activity, but for laying down criteria to which certain activities must conform. And, activities which might count as educating people are as many as there are those that might count as reforming them (Peters, *ibid.*). From this, it therefore follows: to refer to activities as 'educating', implies that they conform to certain very general criteria. It is contended; both 'education' and 'reform' have, as it were, a norm within them, serving as a very remote ideal for such activities, and also structuring them in a certain direction.

On the other hand, "Training" always suggests confinement. People are trained for specific fields, which implies that one follows a narrow path. People are trained for jobs; as doctors, lawyers, and in this particular case, as teachers. This means; no one can be trained in a general sort of way. But, this lack of specificity is just what is suggested by education. There is a strong inclination to deny that we could call a person 'educated' after only developing an awareness and understanding in a limited way. Our notion of an educated person is of a more all-round type of development where one should possess a 'know-how' and some understanding of principles, of the 'reason why' of things (Peters, *ibid.*). Such a notion of education implies that a person's outlook is transformed by what s/he knows and understands.

From the above arguments, perhaps one could conclude that a person might be highly skilled as a teacher; yet, might still be found to be 'uneducated'. In fact, 'Teacher-Education' is commonly referred to as 'Teacher-Training', a term that underlines the concept of the teacher's function as an agent for schooling, possessing special techniques and skills (Myers and Reid, 1974). However, for the purpose of this study, these terms will sometimes be used to mean the same thing.

The body of the literature review for the theoretical background of this study has been organized into three main parts covering the following aspects: the context of educational reform and policy; the concept, of vocational education; and the question of teacher education/training, under which the research problem surfaces into context.

2.02 The context of educational reform and policy

Since different politico-socio-economic situations exist in different countries, educational problems tend to be relative in nature; depending on the particular needs of individual societies. This brings us to the concept of 'curriculum relevance.'

According to Barrow (1984), to argue that curriculum should be relevant or useful is effectively useless in itself, because we need to know whom it should be useful to, what purpose it should be useful for and in whose judgement it should be useful. Barrow (*ibid.*) also asserts that; activities do not possess or lack relevance in the abstract. They possess or lack relevance to particular people, for particular purposes, in particular circumstances. At this stage, society and the individual are of particular interest.

It is widely held that the content of curriculum depends on the society. Any society sophisticated enough to have a concept of education is most likely to regard some knowledge and some skills as worthy of passing on to the next generation. What is judged as valuable depends on a number of factors. Among many, Kelly (1980) gives the following examples; different epistemological styles, different cultures and different stages of development. Moore (1982) also refers to a position maintained in recent years by some sociologists of education who, following a Marxist line of thought, point out that an educational curriculum in fact reflects an interest. Discussing the same issue, Frederick is quoted by Hanson and Brembeck (1966):

In its educational investment a country must adopt a balanced program suited to its own needs and stage of development, or it may run into trouble . . . (p. 148)

Apart from society, we also have the 'individual learner' considered under the issue of curriculum relevance. No matter what the context might be, the learner is the key to the success of any curriculum (Garforth, 1966). Society might aim at achieving certain ideals; but, if the learner's interests are not considered, not much might be achieved! (Garforth, *ibid.*). Politicians, school administrators, teachers and so on might come up with what they might consider to be a wonderful curriculum, only to find the wrong students showing up!

We usually think of a curriculum as having high standards if 'it' covers ground, requires much and difficult reading, demands many papers and if the students for whom it is intended do not easily get 'good' grades. According to Garforth (*op. cit.*), what one needs to ask of a standard is not, "is it high or low?", but "is it appropriate to one's goals?" If your goals are to make people more alike, to prepare them as docile functionaries in some bureaucracy, and, to prevent them from being vigorous, self-directed learners, then the standards in most schools are neither high nor low; they are simply apt. If the goals are those of a new progressive education, one needs standards based on the actual activities of competent and confident learners, genuinely engaged in learning.

Davies (1976) also maintains; any talk about high standards from teachers and school administrators is nonsense, unless they are talking about standards of learning. He also argues that children should be taught how to learn instead of only being given what to learn. Paulo Freire supports such an approach when he advocates 'Problem-posing' as opposed to the 'Banking-concept of education'. (Reid, 1966)

An analysis of Connell's (1966) discussion on curriculum shows that there are at least four causes of irrelevance in education and consequently, four levels on which relevance may be achieved; what is taught, how it is taught, learners' feelings and the learners' concerns. Throughout the

world, in practically all societies, rapid change is occurring in roles and relationships, economic conditions, mores and values, religions and political beliefs, and relations between nations, ways of everyday life and so on. These and other changes in society at large implicitly and explicitly challenge us to re-think the curriculum (Connell, *ibid.*). In most cases, profound changes are needed in school curriculum and in government policies to meet the challenge; hence, the need for reform(s) in education.

Broadly speaking, there are two main forms of educational reforms; 'radical' and 'continuous or gradual'. A good example of the radical type is normally seen in a country soon after gaining political independence. This is when it is most likely that major changes are found necessary in the whole educational system, to suite the new social order. For example, soon after independence in 1980, Zimbabwe overhauled its educational system resulting in among other things, universal primary education and the banning of racial discrimination in all educational institutions. (Kwaira, 1987)

Continuous educational reform is normally found in a politically stable society where only socio-economic conditions determine particular adjustments in the educational system. For example, after the first years of independence, Zimbabwe can now be said to be embarking on continuous reforms, probably concentrating on problems pertaining to the prevailing socio-economic situation. Another example of a country following a similar line of reforms is Sweden, where continuous reforms are also referred to as 'Rolling reforms'. The rationale of continuous reforms is based on the fact that aims and methods of the school must be revised at regular intervals as a matter of routine rather than by sudden and radical reform (OECD-SWEDEN, 1967). At the moment, most of the educational reforms in Sweden are mainly meant to gear the educational system towards technological advancement in a modern society. The necessity of such a continuous revision of curriculum is actually related to the rapid and erratic shifts, qualitatively and quantitatively, in the 'social demand' for education as well as in the 'economic demand' for educated people. Hence, it is affirmed; if 'rolling reform' is to have any meaning, it must be possible to identify and, to some extent, predict such shifts (OECD-SWEDEN, *ibid.*);

... A society which is rapidly changing also requires a different kind of education from that which is sufficient in a more static society. The great majority of citizens must be prepared to change occupations once or twice during their working lives, or to undergo a so thorough re-training that it may be considered equivalent to a change of occupation. There is also constant development and change in the subjects taught and the materials used in education. ... (p. 365)

The whole of this development affects the context in which the work of the school is performed. It is becoming less important for the school to

devote itself to the teaching of facts, which probably will soon be out of date (OECD-SWEDEN, *op. cit.*).

Discussing Aims of Education, Whitehead (1962) warns of the danger of 'inert ideas'. He points out that education with inert ideas is not only useless; it is above all things harmful. Therefore, it is widely held that teaching in a progressive school must concentrate more on answering the questions 'why?' and 'how?', than 'when?' and 'where?' It is important that schools provide pupils with certain fundamental skills and with the capacity and desire to learn new things; not only in class, but also on their own. And in this way, prepare themselves for further education and re-training; natural features of the lives of most adults in the society of tomorrow (OECD-SWEDEN, *op. cit.*). The need for 'rolling reform' can also be linked to the necessity for the education system to increase its productivity. Education is sometimes thought of as one main determinant of the 'residual' factor in economic growth (OECD-SWEDEN, *op. cit.*). There is a strong correlation between a country's educational efficiency and its economic productivity. (Hanson and Brembeck, 1966)

Educational reforms at national level are usually initiated by government. When government has defined policy, then institutional reforms follow down through the various levels in the educational system. In Zimbabwe, one could represent the impact of particular government policies on institutions of education and their respective programs by means of the 'Cross-Model'. This model relates the policy to the institutions concerned; teachers' colleges, university and secondary schools. (see Figure 1)

In common with schools, the institutions involved in teacher education and training, are affected by the prevailing climate of educational change in respect of teaching methods and the organization and content of curriculum. As maintained by Taylor (1969), the manner in which innovations are brought about, the extent to which the institutions responsible for preparing teachers are themselves innovating agencies, the existence of a lag between the introduction of new ideas and the responses of colleges to them; all these are matters on which there is in most cases an absence of hard information. Comment on them is sometimes broadly speculative. This could also be true for Zimbabwe since this is still a grey area.

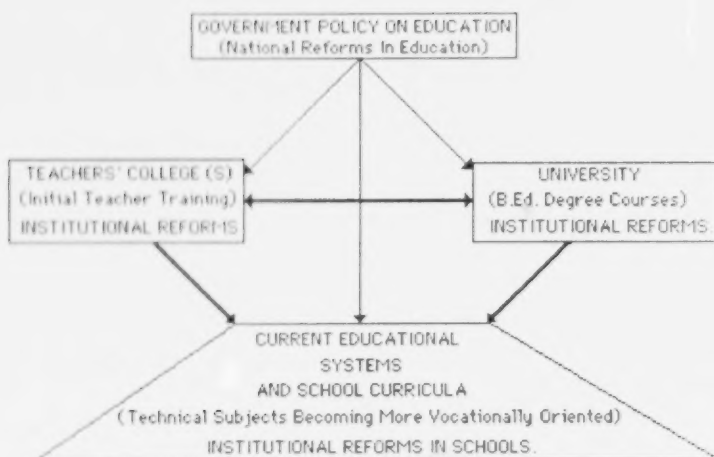


Figure 1. The 'Cross-Model' of the relationships between an educational policy and the various institutions of education in Zimbabwe

2.03 The concept of vocational education

After the above general discussion on reforms in education, perhaps one now needs to analyse the concept of 'vocational education.' 'Vocationalization' of secondary education means curriculum change in a practical or vocational direction. It is said to be an old and recurring policy theme in many countries, especially in the Third World. According to Kazim Bacchus (Laulo and Lillis, 1988), there are many assumptions leading to a conclusion that vocationalization of education enables us to increase the range of relevant skills which school-leavers have and this in effect improves the productivity of their education. Skills which schools pass on through vocationalization of curricula are those likely to be more relevant to the needs of society so individuals possessing such skills should contribute more to development than those lacking them. It is also held;

Note: The arrows linking institutions responsible for teacher training and schools, represent a number of quantitative and qualitative aspects of the two-way relationship between them. The work of the former is affected by that of the latter and in its turn affects, demands for particular types of competency among teachers with respect both to instruction and the broader aspects of socialization. From a comparative outlook, it is interesting to see how this could be related to the situation elsewhere. For example, in countries like Britain, official pressures on colleges in recent years have been of two kinds; those directed to increasing the supply of teachers and those involving changes in the structure of teacher-education. Efforts directed at the first of these two aims have sometimes been seen as having implications for the second. (Tailor, 1969)

education that transmits 'relevant' skills and knowledge, is likely, economically, to yield a greater individual and social rate of return than education which does not (Lauglo and Lillis, *ibid.*). It can safely be argued then, that industrial arts or vocational education programs which aim at providing individuals with skills relevant to the development needs of society, are likely to be more economically valuable both to the individual and to society, than an education which does not transmit such skills. (Lauglo and Lillis, *op. cit.*)

It is interesting to see how countries following different epistemological styles share views in their support of the concept of 'vocational education.' An example of this can easily be seen when one considers Pragmatism and Marxism as represented by the United States and the Soviet Union respectively.

Pragmatism provides varied justification of vocationalization (Lauglo and Lillis, *op. cit.*). It implies that problems of finding and preparing for an occupation should be addressed by the school. Similarly, it is maintained that the uses pupils may have for tools and practical techniques in their private life should be taken into account. Pragmatism also rejects dualism between 'pure' and 'applied' knowledge (Lauglo and Lillis, *op. cit.*). Pragmatists hold the belief that learning occurs best when arising out of 'real-life' problems, and when it is derived from sensory experience. According to John Dewey, very little could be more relevant to groups of children than what they actually feel most about (Reid, 1966). He goes on to assert that the child is the starting point, the centre and the end. By implication, this means that subject-matter can never get into the child from without. Learning is active, and involves organic assimilation starting from within, not from without (Reid, *ibid.*). Therefore it follows, effective teaching should utilize all possible levels of relevance. Simply said; there is no learning without a learner and, there is no meaning without a meaning maker. (Reid, *op. cit.*)

On the other hand, support for practical subjects is also found in the socialist concept of 'polytechnical education' which is rooted in Marxist epistemology, and there are some overlaps with pragmatism (Lauglo and Lillis, *op. cit.*). Such overlaps are found, for example where Marxism also rejects the ideas of dualism between 'theory' and 'practice' (or 'pure' and 'applied' knowledge), and of the educational superiority of the former. The notion of Praxis is central to Marxist epistemology (Lauglo and Lillis, *op. cit.*). Hence curriculum should seek to integrate 'theory' and 'practice.' From this, it appears, 'polytechnical education' does not simply mean vocational education. It is the basis of a sound 'liberal' education and the teaching of its 'working skills' to pupils is carried out during the process of teaching general education subjects, general technical subjects and in teaching about work and production (Holmes, 1965). Literature has revealed that polytechnical education includes

learning about the major branches of the economy and work in industry so as to acquire definite industrial skills. It is therefore designed to perform two tasks; helping to raise production by training workers for a new and changing world while on the other hand, helping to foster the all-round development of the individual. (Galkin, 1959)

Such a design of an educational program is based on the assumption that workers need to possess not only the skills of a trained technician but also wide knowledge of the principles of science and technology as well as an acquaintance with all aspects of modern production (Holmes, *op. cit.*). From the Soviet model of polytechnical education, it is observed that teachers are, apart from their everyday school duties, also encouraged to contribute research reports, articles short notes, and letters to educational periodicals. Attending regional seminars and conferences, presenting papers to pedagogical symposia, writing books, and perhaps, being appointed as district inspectors, provide the opportunities for upward mobility (Zajda, 1980). Also, the rising academic standards in schools require that teachers are more highly trained. At a time when school curricula are being changed to meet the challenge of world affairs, and when new, imaginatively produced materials are increasingly available, the need for teachers adequately prepared to interpret the world scene is unprecedented.

A world outlook is essential for the pre-college student as well as for the undergraduate, but well-trained teachers and adequate teaching materials are lacking in certain cases (Burton, 1964). It appears that teachers' knowledge, particularly in the sciences, needs to be updated at regular intervals in order to keep up with the explosive growth of human knowledge. Teaching methods, education theories, and the social, intellectual, and psychological needs of the pupil will require, according to Soviet educationists, different approaches in decades to come (Zajda, *ibid.*). The validity of any education system naturally, is dependent upon the quality of teaching and the availability of competent teachers (Razik, 1972). Developing nations might learn something from the Soviet experience. In order to meet these demands, each developing country needs to determine the appropriate means for training such qualified instructional personnel (Razik, *ibid.*). Apparently, this task is not simply one of financing or recruiting; it appears to involve the establishment of teacher training systems which reflect the overall expectations of the educational system and the country's various social institutions.

An idea which can be associated with the 'polytechnical approach' to curriculum planning is that of 'education with production'. This concept has been a common theme in socialist rhetoric and policy (Lauglo and Lillis, *op. cit.*). Indeed, 'education with production' has assumed various forms and has been given varied emphasis at different times, in different

countries and circumstances where it has been implemented in various experiments; Zimbabwe being a good example.

To get a clearer picture of what the teaching of 'vocational subjects' actually involves in a secondary school set up, perhaps one needs to consult more literature on the subject of 'vocational education'. Among many, the following countries could have a lot to share in terms of experience on the implementation of 'vocational education' programs; Finland, Greece, Kenya, Sweden and Sierra Leone.

In Finland, 'vocational education' means the following, among other things; providing students with the training they need in order to fit into the world of work as productive members in society, training of students in special places of work (say in a firm), depending on their particular interests, and engaging students in important community services for their 'on the job training' where it is hoped they will gain knowledge and skills. (OECD-FINLAND, 1972)

The Greek experience has shown that vocational education is not easy. Many problems were encountered, particularly at implementation level. In fact, for the Greeks, the task of implementing the policy of technical/vocational education was as complex as it was immense (OECD-GREECE, 1980). It is affirmed, the policy goal of strengthening this type of education and bringing about what was considered to be a more appropriate balance in student flow between general and technical schooling required, among other things, that: new curriculum be designed that would satisfy the general and technical/vocational components of the program; new textbooks be written or adapted from those available; qualified personnel be secured; and systematic efforts be made to allay public anxiety and ambivalence, and to create a more favourable attitude towards technical and vocational schools. However, despite all the problems encountered, one objective remained clear and outstanding; the idea of making curriculum 'relevant to modern life'. (OECD-GREECE, op. cit)

In the case of Kenya, findings have indicated that the idea of vocationalization which is only a supplement to a mainly academic curriculum is no remedy for youth unemployment. Given as a recommendation, was the idea that vocational policies may achieve more by aiming to discourage unrealistic ambitions for further academic study when selection to such study is becoming increasingly competitive, and to teach attitudes conducive to work-place discipline. Findings reported by Lauglo and Lillis (1980), also indicate that Woodwork, Metalwork, Electrical Technology and Power Mechanics are popular subjects attracting students of good academic caliber. The Kenyan experience also shows that exposure to these subjects increases students' interests in

related 'practical/technical' work. However the biggest obstacle in most of the schools studied was the shortage of qualified teachers.

A close study of the Swedish experience shows the entire vocational school system undergoing a process of re-organization. Interest in vocational training has been primarily due to the structural transformation of industry and commerce (OECD-SWEDEN, op. cit.). Processes of production have become so complicated that industry needs skilled personnel to a much greater extent than ever before. In this case, vocational training is supported and promoted by three major interests; the communities, industry and commerce, and the state (OECD - SWEDEN, op. cit.). The main aim of vocational education in Swedish schools is to produce a fully qualified craftsperson or engineer who will go straight into the job market on completing his or her technical/vocational training (OECD-SWEDEN, op. cit.). Most of the teachers engaged in the teaching of technical/vocational subjects are reported to be highly qualified. However, the only problem encountered in the schools is that of instructor/teacher-shortage, mainly due to the competition for manpower of such caliber between industry and schools. (OECD-SWEDEN, op. cit.)

2.04 The question of teacher-education/training

From the experiences of countries so far discussed, it is clear that the concept of 'vocational education' demands a lot from the teacher in terms of professional performance.

There are important techniques and skills that must be mastered by those wishing to teach. But unless there is a primary emphasis on the ends that such means are intended to serve, and a searching exploration of the connections between schools and the society that surrounds them, these techniques and skills exist in a vacuum (Myers and Reid, op. cit). It is alleged that such an emphasis is generally lacking in teacher education and the result is that teachers most often see themselves as merely the implementers of educational policies conceived and directed by others.

A teacher of 'vocational education', apart from teaching in the classroom or workshop, is also expected to act in many other capacities. For example, as teacher/social worker, public relations officer working with the community to promote the school, guidance and counselling officer or teacher/youth leader providing information on career choices to students and, instructor working side by side with other instructors in industry where students are engaged in 'on the job training'.

Where it might be alleged that schools have not been very effective in passing on ideas and skills or that the ideas and skills which schools have tried to pass on in particular school subjects were not really relevant to the needs of society, one might find such an allegation and the issues raised, introducing a shift from policy considerations about vocationalizing curriculum to one concerned with policy implementation. It is perhaps at this point that one should consider teacher education/training and the interpretation of curriculum content or how subjects should be taught in order to increase their productivity. To this end, one could probably also argue for reform in teacher education.

Some countries, while trying to diversify their curricula through vocationalization of technical subjects made the mistake of neglecting teacher training/education. In most cases, this has reflected an underlying conviction that diversification is essentially about buildings and equipment rather than about teacher training and curriculum development. Sierra Leone made this mistake although it was later rectified. When attention was eventually given to the content of diversified programs the result was greater confusion than before (Lauglo and Lillis, *op. cit.*). This confusion apparently was due to the fact that while most project or pilot schools still operated mediocre versions of traditional craft-based syllabuses in Woodwork and Metalwork, teacher education programs embarked on an innovative and integrated approach to technology known as 'design technology'. (Lauglo and Lillis, *op. cit.*) Schools in Sierra Leone have always suffered acute shortages of qualified teachers in technical and other vocational subjects resulting in schools recruiting poorly-qualified craftspersons. Apart from their lack of pedagogical and communicative skills, such teachers have been examples of the 'low status occupations' towards which pupils have shown considerable antipathy (Lauglo and Lillis, *op. cit.*). In a way, this affected the status of these teachers in schools and also influenced the regard which pupils have for technical/vocational subjects.

However, where programs and facilities in teacher training have been improved, the status of technical/vocational teachers has improved too. This should have a positive impact on the way pupils perceive and respond to vocational subjects. It is also hoped that the 'new technical teachers', trained through the new approach of 'design and technology', as already indicated, will transform the technical studies curriculum. It will now reflect a more relevant and effective approach (Lauglo and Lillis, *op. cit.*) Cream A.H. Wright argues that this approach is not only epistemologically viable in itself but also creates much more tangible links between technical studies and other school subjects (Lauglo and Lillis, *op. cit.*). For example, 'design and technology' as an approach, entails a scientific understanding of forces, materials and processes as a basis for problem formulation and problem-solving in the design process.

Unfortunately, in their attempt to transform the technical studies, innovative teachers have faced formidable opposition from teachers and administrators with the traditional crafts approach. Most administrators have been more interested in artefacts than in the education of pupils. (Lauglo and Lillis, *op. cit.*)

In Zimbabwe efforts are now being made to vocationalize technical subjects at secondary school level. Here it appears, the issue is not only that of finding enough teachers to teach these subjects. One would perhaps say; the main issue lies in the professional performance of the teachers concerned.

In fact, the idea of vocational education is not new to Zimbabwe. Like in most African countries, it has a long history, dating back to the colonial days. According to Waller (1977), the introduction of F2 secondary schools in Rhodesia brought in a new dimension in vocational education. In these schools the main emphasis was on technical subjects and/or practical subjects such as Metalwork, Woodwork, Building, Agriculture, and Home-Economics. The treatment of these subjects during the colonial era and today, in as far as vocational education is concerned, could perhaps differ in the philosophy behind their introduction and interpretation during these different periods; one being a dying era, the other, an emerging era. For example, where the subjects were previously meant for less able pupils as indicated by Zvobgo (1986), they are now meant for learners of mixed ability where sometimes students of high academic caliber are attracted. Another difference could be in the fact that where after secondary education, in F2-vocational schools the student was awarded a certificate covering the subjects studied, today it is speculated, the student is supposed to leave school with a certain level of qualification. For example, in a subject like Metalwork, a successful student will leave school with a certain trade-grade enabling him/her to join, say industry at that grade level.

It is interesting to note that researchers like Waller (*op. cit.*), more than eleven years ago, started talking of the need, for secondary and vocational sectors as being one of the highest priority tasks for future educational policy in Zimbabwe. This clearly shows that the need to gear teacher training programs towards realities in schools is not a new issue at all. It has been there for quite some time.

According to Curle (1970), teacher-education is one of the nerve centres of an educational system. More can be done to raise standards of education at less cost through teacher-training than any other activity. Unfortunately, in most developing countries relatively little attention has been paid to this urgent need. In some countries, it is not only that teacher-training needs careful attention but also the establishment of an esprit de corps for the whole teaching profession. (Curle, *ibid.*)

Any reform in teacher-training means changing the whole network of relationships. The two go hand in hand. A proper profession cannot easily be created by an under-privileged, low status, poorly-trained body of men and women (Curle, *op. cit.*). By implication, for any reform in an educational system to be implemented with a reasonable level of success, teacher-training must be included. This assumption is actually based on the premise that teachers are among the most important implementers of any educational reform that affects schools and their curricula, both at national and school levels (Curle, *op. cit.*). Most educational reforms fail to achieve their goals not because they are badly conceived, but because of poorly planned implementation strategies, especially when teacher training programs do not reflect realities in schools. (Curle, *op. cit.*)

The tasks of teachers in a rapidly changing world have become much more complicated (Holmes *op. cit.*). The problem is no longer merely one of adapting buildings, books and equipment to conditions of continuous change, but of enabling teachers and educationists to cope with the demands that these conditions will create on them. Taylor (*op. cit.*) affirms that it is in this context that colleges of education and universities must produce the teachers for tomorrow, and it is against this background that the current programs in these institutions must be evaluated.

Given the basis of a process of change where there is no likelihood of any diminution in the pace of technological innovation during the foreseeable future, it becomes necessary to face up to a situation in which rapid change is a permanent characteristic of the social environment, with inevitable consequences upon curriculum, methods of teaching and school organization (Taylor, *op. cit.*). From this background, one could perhaps be obliged to ask: "In Zimbabwe, where does teacher-education/training stand? Is it keeping pace with changes in educational policy, in schools and in the world of work?" In this case, such questions are being addressed to those institutions involved in the training of technical-subject teachers both, during initial and in-service training. Hence; the research problem leading to this project as already stated, 'a pressing need to study and gain an understanding of the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more and more vocationally oriented.'

3. METHODOLOGY

The main purpose of this study was, 'to determine the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more vocationally oriented.'

Having decided upon the main objective of study as already indicated in the first chapter, the next step was to achieve it. In terms of approach and methodology, one now needs to consider the following: (1) General approach (Type of study), (2) population (subjects), (3) sample size and selection, (4) instrumentation, (5) data collection (procedure) and (6) time schedule.

3.01 General approach

For the purpose of this study, the Case Study Approach was found most suitable. Among other factors, the following were considered; the duration of study, availability of information and the number of institutions to be studied. Since case studies involve the detailed examination of a relatively few persons or items particularly where time might be limited and where information might be lacking, one could justify this method.

3.02 The population (subjects)

Being a case study involving two institutions of higher education; Belvedere Teachers' College and The University of Zimbabwe, the focus of research was on an analysis of the curricula and programs designed for student teachers undergoing initial teacher training at college, and for serving teachers on the Bachelor of Education degree program at the university. The 'population' consisted of students following programs in

Metalwork, Woodwork and Building. Lecturers and C.D.U. officers were also included.

Case studies imply an intensive investigation of a particular situation or phenomenon. It was the intention here to include as many subjects as possible hoping to gather as much information as was possible. One advantage of such an investigation is that it may expose a new relationship whose extent may then be measured by statistical techniques. The researcher, after selecting a case which he/she believes to be typical of a particular situation or phenomenon, may use his/her findings from this particular case to form the base for generalized hypothesis. Bell (1987) affirms that the great strength of a case study is that it allows the researcher to concentrate on a specific instance or situation and so identify the various interactive processes at work. These processes may not show in a large-scale survey but may actually be crucial to the success or failure of systems or organizations.

3.03 Sample size and selection

After identifying the total population, the idea was to stratify it into further groups. Hence, while that at Belvedere was divided into: (a) First year students; (b) Third year students; (c) and Lecturers, that at the university fell into the following categories: (a) B.Ed. students (serving teachers); and (b) Lecturers.

The sample was drawn thus; 100 First year students from a total of 220, 100 Third year students out of 250, all the 15 Lecturers from Belvedere, 36 B.Ed. students out of 56 and all the 3 lectures from the university.

In most studies; particularly in surveys, it is widely held, the sample size should range from 10 % to 20 % of the population. The sample for this study, drawn from the five categories as already indicated, was well above this in percentage per respective group. Since the idea was to obtain as much of the relevant information as was possible, it was found necessary to have a large sample, as long as the subjects were appropriate to the matter in hand. No formal sampling process was found necessary. The subjects came forward on voluntary basis. This was found most suitable since the time of research coincided with the 'end of year examinations'. Almost everybody was busy, and the chances of having a specified group to work with, selected through formal sampling proved slim. For example, at Belvedere most of the subjects were those who had completed their examinations and were finishing off their projects in the workshops.

Normally, even the institutions or organizations under study should be randomly selected. This was impossible since the two institutions studied were the only ones of their kind. For this study, dealing with only two institutions was an advantage since the study was to be carried out by a single investigator within a short period. There was a good chance of making a detailed examination of the issues at hand.

3.04 Instrumentation

The instruments for this study included: a set of five questionnaires, ranging from (A) to (E); a set of six interview schedules, from (A) to (F) and three workshop check-lists, mainly to check on equipment and other facilities. See Appendices (i) to (xii).

Data from First year and Third year students at Belvedere were collected using Questionnaires (A) and (B) and Interview Schedules (A) and (B) respectively; (A) covering first years and (B) third years.

Data from lecturers at Belvedere were collected using Questionnaire (C) and Interview Schedule (C).

From students and lecturers at the university, data were collected through Questionnaires (D) and (E) and Interview Schedules (D) and (E) respectively; (D) being for students and (E) for lecturers.

Interview Schedule (F) was used during interviews at the Curriculum Development Unit (C.D.U.).

Questionnaire (A) consisted of ten items; numbered 1 to 10. In items 1 to 5, information about the respondents; their sex and their secondary school educational background was asked for.

In item 6, the respondents were asked to indicate whether they had had a chance to choose their subject combinations comprising the technical and academic components.

Item 7 required the respondents to indicate whether any link existed between their main subject areas and their studies in the Theory of Education. Respondents had four alternatives from which to choose, and these included 'very close, fairly close, remote' and 'difficult to tell.'

In item 8 respondents were asked to indicate the degree to which they either agreed or disagreed with four statements concerning the capacity of

their workshops, and the relevance of their course of studies. The five alternative responses available ranged from 'Strongly agree' to 'Strongly disagree'. In part (v) of the item, respondents had a chance to comment on any of the four statements.

In item 9, the respondents had to indicate how well informed they were about the current changes within the Zimbabwean educational system; particularly the move to vocationalize the teaching of Technical Subjects at secondary school level. Three alternatives ranging from 'very well', 'fairly well' to 'barely informed' were given. For the sake of further information, respondents were also asked to say what they knew, if they happened to be informed. And, where they were not informed at all, they were asked to mention what they wished to know.

Lastly, in item 10, respondents could comment on any aspect of the whole questionnaire. - [See Appendix (i)]

Questionnaire (B) consisted of twelve items; numbered 1 to 12. In items 1 to 5, the researcher asked for information about the respondents; their sex, subject combination, where they had gone for their last teaching practice, what levels or classes they were teaching and whether they had been prepared well enough to teach at these levels.

Item 6 comprised two parts; (a) and (b). In part (a) respondents were asked to indicate the degree to which they agreed or disagreed with nine statements based on their knowledge of technical-subject syllabi, their experiences as teacher trainees and their views concerning their course of studies. The five alternative responses provided ranged from 'Strongly agree' to 'Strongly disagree'. Part (b) gave the respondent a chance to comment on any of the nine statements.

Items 7 and 8 were about teaching practice. Respondents were asked to say what other duties they were expected to perform apart from their everyday duties as teachers in their respective subject areas. Where other duties were performed, respondents were asked to indicate whether they had anticipated such possibilities. They also had to indicate whether they preferred to go back to the same school or not during their fourth year teaching practice.

In items 9, 10 and 11 respondents were asked to mention those aspects of their course of studies and their major subject areas they considered most important. Secondly, they also had to mention what they considered irrelevant. In each case, reasons were also asked for.

The respondents had a chance to comment on any part of the whole questionnaire in item 12. - [See Appendix (ii)]

Questionnaire (C) had eight items. Items 1 to 2 sought information about the respondents; their subject areas, professional backgrounds and the number of years they had worked at Belvedere as lecturers.

In items 3 and 6 respondents were asked to indicate the degree to which they agreed or disagreed with statements concerning their knowledge of the Zimbabwean educational system, course content of the teacher training program(s) that they were involved in, teaching practice and other related issues in teacher training. The items had seven statements each. Under each item, respondents had five alternative responses from which to choose; ranging from, 'Strongly agree' to 'Strongly disagree' in item 3 and from 'Totally agree' to 'Totally disagree' in item 6. In either case, there was room for personal views and comments from the respondent.

In items 4 and 5, respondents were asked to indicate whether they were currently involved in any upgrading courses for technical-subject teachers and whether they had ever worked with student-teachers on teaching practice. 'Yes' and 'No' were the alternative responses in either case.

In item 7 respondents were asked to list what preparations were necessary and what knowledge and skills student-teachers were supposed to acquire before going on teaching practice.

Lastly, in item 8 the respondent had a chance to comment on any of the issues in the questionnaire. - [See Appendix (iii)]

Questionnaire (D) contained eleven items. From item 1 up to 6, respondents gave information about themselves; their areas of study, the subjects they had taught before joining the B.Ed. program, place and year of initial teacher training, major subject (s) during initial training and the number of years they had waited to join the B.Ed. program.

In item 7 respondents were asked to list, starting with what they considered most important, those topics they were expected to cover within their major subject areas. They were also asked to list those topics they thought should have been included in their course of studies but were not.

In item 8, respondents were asked to list all the other duties, apart from teaching in their subject areas, that they were expected to fulfil in their previous schools.

Item 9 had six components under which respondents were asked to indicate the degree to which they either agreed or disagreed with

particular statements. The statements were centred on their views regarding the value of their initial training and how they valued certain aspects of the training they were undergoing in the B.Ed. program. Five alternative responses, ranging from 'Strongly agree' to 'Strongly disagree' were provided.

Item 10 had three alternative responses where respondents could indicate how well informed they were about the current changes in the Zimbabwean educational system, particularly the move to vocationalize the teaching of technical subjects at secondary school level. The three alternative responses provided included; 'very well', 'fairly well' and 'barely informed'.

In item 11, respondents could give their personal views or comments on any aspect in the whole questionnaire. - [See Appendix (iv)]

Questionnaire (E) had four items. Item 1 was in two parts; (a) and (b). In part (a) respondents mentioned their subject areas and in (b) they were asked to give a brief account of their professional backgrounds.

Item 2 comprised ten parts under which respondents were asked to indicate the degree to which they either agreed or disagreed with particular statements. The ten statements were centred on changes within the Zimbabwean educational system, technical-subject syllabi and individual views on various aspects of the B.Ed. program. In each case, respondents had five alternative responses to choose from. Again, these alternatives ranged from, 'Strongly agree' to 'Strongly disagree'.

In item 3 the researcher sought evidence of any cases where activities; particularly those relating to the training of technical subject teachers, were linked between Belvedere and the university.

Lastly, under item 4, respondents could comment on aspects relating to the whole questionnaire. - [See Appendix (v)].

3.05 A note about questionnaire construction

The views of respondents were measured in a similar way to how attitudes are usually measured in a survey questionnaire.

While similar studies had been conducted, no instruments were found appropriate for use with lecturers, serving teachers and student teachers in this particular study. Therefore, it was necessary to construct such

instruments. Certain steps had to be adopted in the construction of these instruments to enable the reading and measurement of individual views.

Most social scientists recommend the following steps:

- (i) construct a number of items which represent views about the subject or issue at hand.
- (ii) classify each item according to whether it reflects a positive or a negative view.
- (iii) administer the instrument to a sample of appropriate size.
- (iv) Score the responses using the following Likert-like scale:

<u>Positive:</u>	strongly agree	5
	agree	4
	undecided	3
	disagree	2
	strongly disagree	1
<u>Negative:</u>	strongly agree	1
	agree	2
	undecided	3
	disagree	4
	strongly disagree	5

However, in this study, several choices were made. For example, only the positive scaling system was followed. And, 'strongly' and 'undecided' were used inter-changeably with, 'totally' and 'not sure'.

3.06 Interview schedules

There were six interview schedules specially designed for use with particular groups; students, lecturers and C.D.U. officers. The main advantage of these instruments was their flexibility. For example, in some cases, discussion could be extended, depending on the issue at hand. Some of the items included in interview schedules (A), (B), (C), (D) and (E) were similar to those in Questionnaires (A), (B), (C), (D) and (E) respectively. This was mainly for cross checking purposes.

Schedule (A) comprised seven items. In items 1 and 2 the interviewee's sex and subject combination were stated for the purpose of grouping.

Under items 3 and 4 interviewees were asked to comment on the capacity of their workshops in terms of facilities. They were also asked to say what

they thought about the amount of preparation they had had during the year in preparation for a year's period of teaching practice.

In items 5 and 6 interviewees were asked to say which aspects of their course of studies they thought were most important for their professional development. In some cases, they mentioned the elements they found irrelevant. Reasons were also given.

The last item was on the move to vocationalize the teaching of technical subjects at secondary school level. Interviewees were asked to say what they knew about the move; particularly what it involved. [Appendix (vi)]

Schedule (B) had fourteen items. After the indication of subject combination in item 1, the rest up to item 9, concentrated on issues relating to Teaching Practice.

In items 10, 11, 12 and 13 interviewees were asked to indicate what they thought was relevant or irrelevant in their course of studies and why they thought so.

Under item 14, discussion was centred on current changes in the educational system. - [See Appendix (vii)]

Schedule (C) contained nine items. In item 1, the interviewee would indicate what subject area he/she specialized in.

Items 2 and 3 were about the current changes in the educational system and what effect this could have had on teacher training programs at Belvedere.

In items 4 and 5 the interviewer sought knowledge about what links existed between Belvedere Teachers' College, Curriculum Development Unit and the University of Zimbabwe in as far as the training of technical-subject teachers and other curricula issues were concerned.

Items 6 and 7 were about teaching practice. Respondents were asked to indicate how much supervision students had and what problems were being found common to students on T.P.

Item 8 was about the students' project work.

Item 9 called for any other issues relating to teacher training. Interviewees' questions were also discussed. Suggestions were welcome and ideas could be shared at this stage. - [See Appendix (viii)]

Schedule (D) The thirteen items in this instrument were about one's subject area, professional background, knowledge of the current changes in the educational system and one's views on particular elements of the B.Ed. program - [See Appendix (ix)]

Schedule (E) The nine items in this instrument concerned current changes in the educational system and issues relating to the B.Ed. program. The question of linking activities at Belvedere, university and Curriculum Development Unit; particularly those relating to the area of teacher training was also discussed. - [See Appendix (x)]

Schedule (F) had nine items under which the impact of the current changes in education on teacher training programs was discussed. Co-ordination of programs between Curriculum Development Unit, Belvedere and university; particularly those relating to teacher training, was taken up. There was also an opportunity to find out what sort of professional background one needed in order to qualify as an instructor or teacher in the newly-established pilot schools where the 1987 Educational Policy was being pioneered. - [See Appendix (xi)].

3.07 Workshop check-lists

Three workshop check-lists were used mainly to check on equipment and other facilities. This was done at Belvedere in the following departments: Metalwork, Woodwork and Building. An inventory was later prepared for each department. - [See Appendix (xii)].

3.08 Instrument validity

As a result of reviewing literature, a number of items aimed at acquiring information and representing views that could be held by lecturers and students were developed. However, before these items were formatted into the preliminary drafts of questionnaires and interview schedules, an effort was made to establish content validity.

According to Ghiselli (Ghiselli et. al., 1981), 'content validity refers to the extent to which a given instrument represents the content of interest'. Most social scientists argue that, 'content validity' can be established by using a panel of experts to examine the given content systematically and evaluate its relevance to the specified case. Therefore, for the purpose of

this study, several experts and subject specialists were actually consulted during the early stages in the development of each instrument. These experts included the project supervisor and colleagues studying related technical subject areas. (particularly those studying Metalwork, Woodwork and Building Technology)

Specifically, the specialists and experts were asked to read every item in each instrument and to indicate: (i) whether the items represented views that could be held by lecturers and students involved in teacher training programs; and (ii) whether the type of information or knowledge looked for was of any significance in the development of the whole study.

As a result of the feedback from the experts, a number of items were either modified or dropped. There was a lot of constructive criticism and a number of suggestions were made. For example, the project supervisor suggested the use of Likert-like scales which he thought would make the interpretation of views relatively easier.

In addition to establishing content validity, an exploration of the possibility of establishing 'construct validity' was also considered. However, accomplishing this would have meant obtaining a separate measurement of views made through a similar set of instruments. Since no similar instruments had been revealed by literature and no other instrument had been developed to measure this construct, it was found impractical to attempt such a procedure.

3.09 Instrument reliability

The next step in the development of the instruments was to establish reliability. 'Reliability', in this context, is defined as the ability to measure a construct on repeated occasions with consistent results under similar conditions (Bell, op. cit). Usually, in order to establish reliability, it is necessary to conduct a pilot study.

In this study, the best that could be done for a pilot study was only possible with a group of ten student teachers, two serving teachers and four lecturers. Although this pilot study involved such a small number of people, the response rate was 100 %. However, it was found necessary to exclude all these from the sample.

From the results of the pilot study one had a rough idea of the following: (i) how long it would take respondents to complete questionnaires under normal circumstances; (ii) whether the instruments were clear enough; (iii) whether the respondents objected to answering any of the questions;

(iv) whether anything important had been left out; and (v) whether the layout of each of the questionnaires was attractive enough. Comments and contributions were also welcome. The results were in fact the basis for a revision of the questionnaires before the main distribution.

Like after the consultation of experts for content validity, the pilot study also resulted in some of the items being either modified or dropped altogether. For example in Questionnaire (A), all items relating to 'Observation Period' were excluded from the final questionnaire because the subjects concerned had not gone for this exercise.

3.10 Data collection (procedures)

Now that instruments were seen to be reasonably valid and reliable, data collection commenced with the distribution of questionnaires at both Belvedere and university.

(a) Questionnaire administration

The distribution of questionnaires went according to schedule. (see heading 3.12 at the end of this chapter). All questionnaires were administered by the researcher. This proved very important where explanation was necessary. Lecturers helped in the distribution of questionnaires, especially where large groups were involved.

Most of the questionnaires were completed there and then and collection was no problem. Where questionnaires were left behind, lecturers did the collection.

(b) Conducting interviews

Students were interviewed, either in workshops or in halls of residence during their spare time.

Lecturers were interviewed during break time in the staff-room and during other times, either in offices or in their homes.

For the Curriculum Development Unit (C.D.U.), appointments were made by phone.

(c) The completion of workshop check-lists

These check-lists were completed with the help of lecturers, workshop assistants and technicians.

(d) The collection of documents

To support the information given on questionnaires and during interviews, several documents were also collected and studied. These included: reports, prospectuses, syllabi and other related course documents. (see heading 4.03 in the fourth chapter).

3.11 Statistical procedure (methods of data analysis)

Data were analysed to answer the nine research questions as given in the first chapter, and methods are explained as they relate to each question.

Questions 1 to 4 required a qualitative approach to the analysis of data. Answers to these questions were drawn from the data obtained from documents, interview schedules completed with lecturers and curriculum development officers at C.D.U.

Question 1 Data drawn from interview schedules (C) and (E) were used to answer this question. Interview schedule (C) contained information given by lecturers at Belvedere Teachers' College. Schedule (E) had information from lecturers at the university. Documents collected from the two institutions and other sources were also useful in answering this question.

Question 2 Like the first, this question was also answered during interviews with lecturers at both college and university. Hence, data drawn from interview schedules (C) and (E) were the major sources of information used to answer this question.

Question 3 Interview schedules (D) and (F) were the main sources of information used to answer this question. Schedule (D) contained information given by the serving teachers at the university, while schedule (F) had that provided by officers at the Curriculum Development Unit.

Question 4 Like question 3, this question was also answered through information given during interviews with serving teachers at the university and during interviews at the Curriculum Development Unit.

Question 5 This question was discussed during interviews at Belvedere, university and C.D.U. Interview schedules (C), (E) and (F) were the main sources of information.

Questions 6, 7, 8 and 9 were mainly based on a quantitative analysis of data from questionnaires (A), (B), (C), (D) and (E). However, a few items also required to be analysed qualitatively.

Raw data were transferred from the completed questionnaires onto A2 size cartridge work sheets specially designed for the purpose of establishing a 'primary data base'. This gave a quick visual impression of the data before a more detailed analysis.

The information was then entered into a Macintosh computer to establish a 'secondary data base'. Once in the computer, data could be computed and analysed using STATVIEW 512+TM; a program specifically designed for data analysis. This program gives several descriptive statistics, for example; the mean, standard deviation, variance and frequency distribution. *Appendix (xx)* shows the specimen of a table extracted from the data base using the program. The table shows a wide range of descriptive statistics. However, not all statistics were relevant. Therefore, only those useful for this study were selected and used appropriately. Most of these statistics were used in the fourth chapter where the results and findings of the study are brought forward.

Question 6 This question concerned the views of first and third year students at college regarding the nature and value or relevance of the preparation they have in college before going into schools. Descriptive statistics were derived respectively for items 8 and 6, in questionnaires (A) and (B). Scores could range from 1.0 to 5.0. A mean score of between 5.0 and 4.0 was judged positive. A mean score of between 2.0 and 1.0 reflected negative views. Anything around 3.0 was taken to indicate an element of indecision. In fact, 'indecision' was declared on scores above 2.0 and/or below 4.0.

Question 7 This question concerned the views of the serving teachers on the B.Ed. program regarding the nature and value or relevance of their course of studies. Statistics were derived for item 9 which comprised eleven elements. Scores could range from 1.0 to 5.0 on each element. A mean score of between 5.0 and 4.0 indicated positive views held by respondents on a particular aspect. 'Indecision' would be declared where a mean score featured around 3.0, that is anything above 2.0 and/or below 4.0.

Question 8 and 9 Both questions concerned the views of lecturers at college and university regarding the programs in which they were involved. Therefore, descriptive statistics for items 3 and 6 in

Questionnaire (C) and item 2 in Questionnaire (E) were derived respectively. Again, scores could range from 1.0 to 5.0 on each element. A mean score of between 5.0 and 4.0 was judged to indicate of a positive view held by respondents on a particular aspect. On the other hand, a mean score of between 2.0 and 1.0 was taken to indicate a negative view. Indecision would be reflected where a mean score ranged around 3.0; anything above 2.0 and below 4.0.

Note: Whatever judgment was made concerning individual scores had to be accompanied by an appropriate explanation; especially where 'indecision' was declared. Information was also drawn from related interview schedules.

3.12 The time schedules

Date as at Week-endings	Activities
18-11-88 to 02-12-88	- Distribution of questionnaires at Belvedere/College. - Distribution of questionnaires at the university. - Collection of all questionnaires. - Interviews at both institutions. - Completion of check-lists at both institutions during lectures and workshop activities.
09-12-88 to 23-12-88	- Visits to libraries in search of documents. - Visits to the Curriculum Development Unit in search of documents, (e.g. syllabi) and to conduct interviews.
30-12-88 to 06-01-89	- Christmas and New Year vacation.
13-01-89 to 20-01-89	- Rounding off research activities in Zimbabwe and back to Sweden to compile the project report.

Note: The ground work for this study was prepared through/by the Department of Curriculum Studies (U.Z.). They communicated with B.T.C., C.D.U., and so on. This was well before the arrival of the researcher in Zimbabwe. - [see also, Appendix (xxi)].

4. RESULTS AND FINDINGS

This chapter presents the results and findings. For *results*, one needs to consider the following; (1) the questionnaire return rate, (2) the number of interview schedules completed, (3) the actual documents collected, and (4) the number of workshop check-lists completed.

4.01 Questionnaire return rate

Questionnaire (A) Of the one hundred questionnaires distributed, a 100 % return rate was achieved. Respondents took about twenty minutes to complete the questionnaire.

Questionnaire (B) Ninety six questionnaires were completed and returned. Four could not be accounted for. Most of the groups could not complete the questionnaires there and then because they were busy in one way or another. So, a few questionnaires were left behind for completion and collection at a later stage. Respondents took about twenty five minutes to complete the questionnaire.

Questionnaire (C) All the eleven questionnaires distributed to lecturers at Belvedere were completed and returned. They took about twenty five minutes. Although fifteen lecturers were involved in the study, four could only find time for a quick interview after work.

Questionnaire (D) All the thirty six questionnaires distributed to serving teachers were completed and returned. Respondents completed the questionnaire in about twenty minutes. All questionnaires were completed and returned there and then, except for one or two which were returned the next day. Most of the respondents were in a hurry since they had come from their homes, to collect projects which they had left on display at Belvedere.

Questionnaire (E) All the three questionnaires distributed were completed and returned. Respondents took about twenty minutes to completed the questionnaire.

Note: Although a few questionnaires were not returned, not much was lost since the sample was still much greater than the normally recommended 10 % to 20 % of the whole population.

4.02 Interview schedule completed

Schedule (A) A total of five schedules were completed and interviews took about thirty minutes each.

Schedule (B) With each interview going on for about thirty five minutes, eight schedules were completed.

Schedule (C) With about forty minutes for each interview, seven schedules were completed.

Schedule (D) Five interviews of about thirty minutes were completed.

Schedule (E) Two of the three lecturers at the university were interviewed on the same day. The first interview took about forty five minutes and the second one went on for about fifty five minutes.

Schedule (F) Two officers at C.D.U. were interviewed on different days. The first interview took about an hour and the second one about forty minutes.

4.03 Documents collected

The following documents were collected:

(a) From the University of Zimbabwe;

- (i) The 1986 report of the Teacher Education Review Committee (TERC) from the Associate College Centre,
- (ii) Metalwork Syllabus and Course Outline (1988),
- (iii) Woodwork Syllabus and Course Outline (1988), and,
- (iv) Building Syllabus and Course Outline (1988).

(b) From Belvedere;

- (i) Metalwork Syllabus and Course Outline (1986-88) and (1989),

- (ii) Woodwork Syllabus and Course Outline (1986-88),
- (iii) Building Syllabus and Course Outline (1986-88), and,
- (iv) the 1986 College Prospectus.

[See Appendices (xiii) to (xviii) for more details on B.T.C. and U.Z. Syllabi]

(c) From the Curriculum Development Unit:

- (i) ZNCC (Zimbabwe National Craft Certificate) Syllabi for 1988-89;
 - Machine Shop Engineering Syllabus,
 - Carpentry/Joinery Syllabus,
 - Brick/Blocklaying Syllabus,
- (iv) 1988 Cambridge Syllabi for Metalwork, Woodwork and Building in schools.

4.04 The number of workshop check-lists completed

Three check-lists were completed for the following departments:

- (a) Metalwork;
- (b) Woodwork, and,
- (c) Building,

Three inventories were compiled using details from these check-lists.
[For more details, see appendix (xii)]

The *findings* of this study are presented as they relate to each of the nine research questions listed in the first chapter.

4.05 Answers to the secondary research questions

1. What measures or steps have so far been taken, or are being taken by the institutions involved in the training of technical-subject teachers to gear their programs towards the present secondary school curricula?

Several measures were mentioned during interviews with lecturers, both at Belvedere and at the university. Certain measures were common to both.

Among many, the following were revealed:

- (i) continuous revision and modification of syllabi, both at college and departmental levels.
- (ii) continuous efforts to introduce and/or incorporate Design and Technology approaches in teaching.
- (iii) the acquisition of more advanced equipment, particularly machinery.
- (iv) efforts to secure more relevant and appropriate course literature.
- (v) efforts to establish links with certain industries for the purpose of sharing ideas about design and technology.

Generally, a lot of progress has been made in both institutions regarding these measures.

2. (i) If anything has been done or is being done, what difficulties have been, are being or could be faced in the process?

(ii) And if there are any problems already existing or anticipated, what efforts have been made or are being made either to solve or to prevent them?

Despite the progress reported under *Question 1*, a number of difficulties have been encountered. Some of the lecturers from Belvedere have been sent abroad for further training; for example to England for courses in Craft Design and Technology. The first group was in 1984. And currently, there is still a group on the same program. While this has

meant a great achievement in the development of technical subjects, there has been the problem of under-staffing in college. With little being done to replace lecturers on courses, most departments have been critically short of staff.

On measure (i), the main obstacle has been lack of information. Lecturers alleged that C.D.U., closely in touch with schools, does not pass on enough information about curriculum changes in schools. Where information is given, it is often too late. As a result, some elements in teacher education programs are rendered obsolete. Teacher education is found trailing too far behind, in terms of change. This problem existed at both Belvedere and the university. As a possible solution, most lecturers have proposed regular meetings with C.D.U. So far, very little has been done although some departments at Belvedere, for example Metalwork, have reported consultation with C.D.U. on certain curriculum issues.

Measure (ii) was initiated after the introduction of technical kits in schools by C.D.U. These kits entailed the incorporation of Design, Science and Technology in teaching at secondary school level. A good example of where this has had an impact is in the Metalwork department at Belvedere where a comparison of the 1986-88 syllabus and the current (1989) syllabus reflects a major difference. In the new syllabus, 'Design and Technology' is brought in as an entity. Moreover, the syllabus reflects Technology at school level with the following sub-areas; Mechanisms, Structures, Pneumatics, Electricity and Basic Electronics. [(For more details regarding this, see appendix (xvi))]

However, the main obstacle has been that of some lecturers being reluctant to adopt the new approach of 'Design and Technology'; particularly those who have not yet had the opportunity of further training. It seems these members are finding it difficult to change their approaches, and perhaps they feel their positions threatened. At the university, this has not been much of a problem. At Belvedere, efforts have been made to improve the situation through workshops and seminars where the topic of 'Design and Technology' has featured as a major issue. It is hoped this will help by making people aware of the advantages of adopting 'Design and Technology' approaches in teaching both, at secondary school and tertiary levels.

Rigid examination systems in secondary schools are also making the development of Design and Technology difficult. This was expressed both at college and at the university. No particular solution was indicated to have been tried so far. So, this challenge remains.

Measure (iii) Although a number of pieces of equipment and machinery have been acquired at Belvedere, getting spare parts has been a problem. Some of the machines, particularly the lathes in the Metalwork

department, are not really what one could classify as advanced machinery. They appear to be inferior and the main weakness is the gearbox where the gear-train easily shear. Technicians in the department reported that the older type of lathe, (Boxford) had been found more durable. Since this equipment has been shared between university and college this could be a common problem although lecturers at the university did not mention it.

For the university, getting enough of the relevant and appropriate literature has proved difficult since most, if not all, has to be imported. The situation has been worsened by lack of foreign currency. To alleviate this problem, students are able to borrow books from departmental libraries on a daily or weekly basis. Most of the literature is actually the personal property of the lecturers concerned. Handouts have also proved important.

On the issue of efforts being made by university lecturers to establish links with industry, no particular problems were mentioned. It is too early to see what the outcome will be. Not much ground had been covered as yet. Progress seems to be very slow.

3. (i) *Is there or has there been a need to upgrade staff already in service?*
 (ii) *If so, what efforts have been or are being made to meet the need?*

According to C.D.U. officers interviewed, there has been and there still is, an acute shortage of well qualified technical-subject teachers at secondary school level. There is then, a great need to upgrade the existing teaching force. In fact, there is evidence indicating that this need dates back to the colonial era (see second chapter). Then, very little was done. However, a few important research studies, for example the work of Peter Waller in 1977, brought to light areas of need. (see first chapter)

Since independence, a lot has been done to upgrade staff through in-service courses. This upgrading was mainly done at Gweru Teachers' College (G.T.C.) where it continued up to 1980. At the end of 1982, technical subjects were transferred from G.T.C. to Belvedere Teachers' College (B.T.C.). During interviews at C.D.U., no explanation was found as to why in-service courses at G.T.C. were suddenly stopped when more teachers still needed to be upgraded.

It was only in 1984 that a program introduced by the Ministry of Education with the assistance of the British Council, materialised. Some lecturers from Belvedere and a few teachers from schools around the country went to England for a B.Ed. course in Craft Design and

Technology as already mentioned. This was a turning point in the history of technical subjects in Zimbabwe.

A B.Ed. course in Building was started at the university three years later. In 1988, with the assistance of the Swedish International Development Agency (SIDA) Woodwork and Metalwork were established. Parallel to this, was the 1988-89 Masters of Arts degree program in Sweden. This would, if successful, contribute to the development of technical subjects in Zimbabwe; particularly, through staff development. A lot of progress has been made since independence but there is still much to be done.

4. (i) *If anything is being done or has been done to meet the need, what problems have been, are being, or could be faced in the process and what are or could be possible solutions?*

(ii) *And, where particular solutions could have been tried in solving certain problems, what has been the outcome?*

Efforts to upgrade staff have not been without difficulties. As already mentioned, sending part of the staff from Belvedere for eighteen months of further training has meant a great shortage of staff in certain departments; particularly in Metalwork, Woodwork and Building. No solutions have been found for this problem apart from having those lecturers remaining behind taking more than their normal loads. Lecturers have naturally complained about over-work. They indicated that they sometimes find it difficult to prepare their lectures properly.

Teaching practice has also been affected to a certain extent: some of the students have not had enough supervision. However, efforts have been made to have as many students as possible within reach; in or around Harare (see table 1 on T.P. deployments). Although there have been cases of students failing to get their specialist subjects in certain schools and ending up in schools quite far from Harare, the numbers have been reasonable.

At the university, the main problem has been that of large numbers competing for very few places resulting in large numbers being turned down. The capacity of the university for the B.Ed. program, is still very low. Faced with the problem of limited places, the idea has been to give first preference to those who have been in service longest. The first intakes have had people with more than the minimum two year experience. For example, the thirty six serving teachers in the sample had an average of eight years teaching experience.

Table 1. T.P. areas and the number of students deployed in each case

BAR	ELEMENT	COUNT	%
1	Harare	22	23
2	Mash/Central	18	19
3	Mash/East	18	19
4	Mash/West	14	15
5	Mutare	2	2
6	Midlands	3	3
7	Bulawayo	4	4
8	Masvingo	6	6
9	Manicaland	9	9

KEY:Bar - area number.Element - areaCount - number of students in that area.Note (i) This information was obtained from item 3 of Questionnaire (B).

(ii) Areas 2, 3, and 4 are considered to be around Harare; hence, lecturers indicated that they had no problems visiting and supervising students in those areas.

(iii) Areas 5 to 9 are quite a long way from Harare and lecturers indicated that they had problems visiting students in those areas.

5. To what extent have activities at C.D.U., B.T.C. and U.Z. been linked, regarding the development of curricula and the training of technical subject teachers?

No formal links exist between the three. Belvedere and the university, are only sharing facilities. For example, serving teachers go to Belvedere for their practical lectures. As one of the lecturers at Belvedere put it, "There is only sharing of facilities, but not of ideas. They do their own thing and we do our own thing!"

Between Belvedere and C.D.U., the situation seems to be better. There have been a few cases where ideas have been shared; for example, when students at Belvedere helped in the building of technical kits which were later distributed to schools by C.D.U. Some heads of departments at Belvedere also mentioned cases where they were consulted during the design of syllabi for pilot schools. The only department that did not report such consultation was Woodwork.

Both C.D.U. and the university reported that the biggest problem has been lack of communication. Yet, both parties claimed that they had tried to initiate links. This was revealed during interviews at C.D.U. and at the university.

6. What are the views of student teachers undergoing initial teacher training, regarding the nature and value or relevance of the preparation they have in college before going into schools?

(a) Views of first year students

On the whole, first year students responded positively to all the eight statements in question. With the lowest mean score at 4.0, it is clear that they generally agreed with the given statements. On this mean score, while the minimum score was 1.0 the maximum was 5.0. (see table 2 and figure 4)

With the highest mean at 4.5, the minimum score was 3.0 while the maximum was 5.0. (see table 2 and figure 3)

The positions of the highest and the lowest mean scores can be located in figure 2 where they can also be related to all the other mean scores.

Table 2 gives more information on responses relating to each of the eight statements in question. Each mean score has additional information relating to it.

Table 2. All mean scores and related details, item 8, Questionnaire (A)

NO *	MEAN	STD.DEV. #	SCORES		RANGE	COUNT
			Min	Max		
8 (i)	4.3	0.7	2	5	3	100
8 (ii)	4.0	1.1	1	5	4	100
8 (iii)	4.0	0.9	2	5	3	100
8 (iv) a.	4.2	0.8	1	5	4	100
8 (iv) b.	4.3	0.7	2	5	3	100
8 (iv) c.	4.3	0.6	3	5	2	100
8 (iv) d.	4.4	0.7	2	5	3	100
8 (iv) e.	4.5	0.5	3	5	2	100

KEY.

* - This refers to statement numbers as given in Questionnaire (A).

- Standard Deviation.

Min. - Minimum.

Max. - Maximum.

Note: Although statements 8(ii) and 8(iii) have the same mean score of 4.0 in this table, taken to two decimal places, statement 8(iii) has a higher score. According to the STATVIEW 512+TM data base the respective scores are 4.00 and 4.04. (to two decimal places)

STATEMENTS

- 8.(i) Since I am going to be on teaching practice next year, I feel fully prepared after my time in colleges this year.
- 8.(ii) From my experience during secondary education, I find the tools and other equipment in the college workshop (s) adequate.
- 8.(iii) Understanding the challenges awaiting me in schools after my training, the textbooks I am using for this course are relevant and appropriate for my level.
- 8.(iv) From my experience during secondary education and/or during 'observation period', the activities that I am covering in this college are quite relevant in terms of knowledge and skills. These include the following:
- (a) Practical project work;
 - (b) Allied theory;
 - (c) Applied Education;
 - (d) Theory of Education, and
 - (e) Peer group teaching.

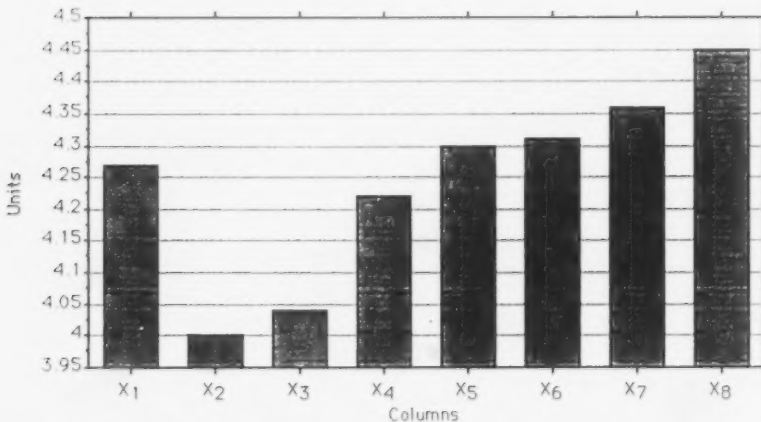


Figure 2. All the mean scores for statements 8.(i) to 8.(iv)

KEY:

Variable	Statement	Variable	Statement	Variable	Statement
x1	8(i)	x2	8(ii)	x3	8(iii)
x4	8(iv)a.	x5	8(iv)b.	x6	8(iv)c.
x7	8(iv)d.	x8	8(iv)e.		

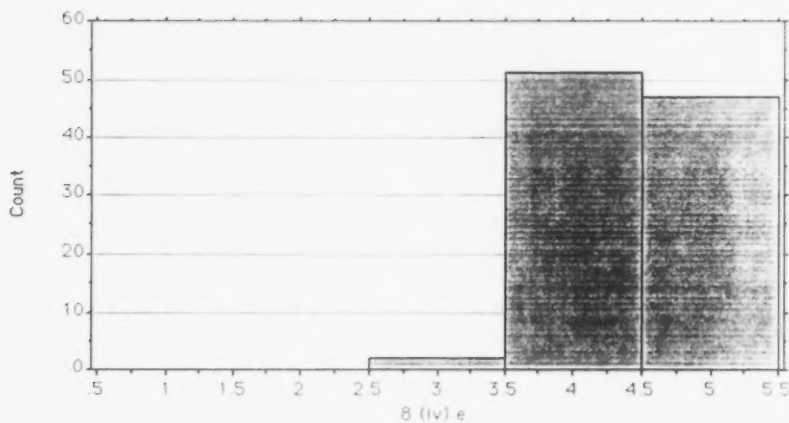


Figure 3. Frequency distribution for the highest mean in Figure 2

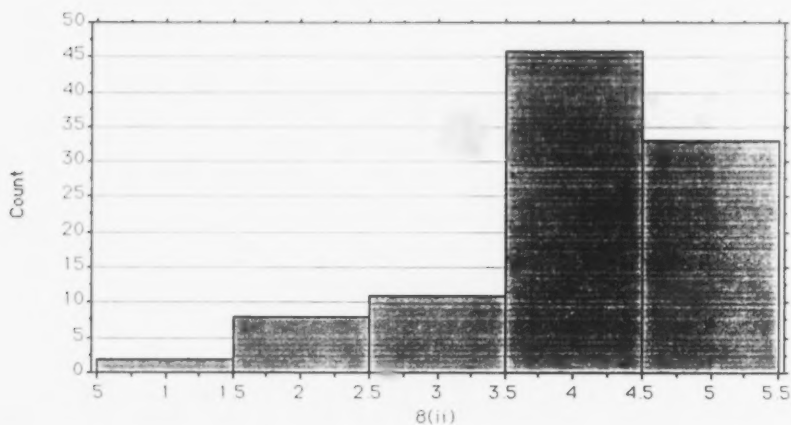


Figure 4. Frequency distribution for the lowest mean in Figure 2

(b) Views of third year students

This group was found to be undecided on eight of the eighteen statements. The mean scores for these statements were judged to indicate indecision since they were above 1.0 to 2.0 and fell below the range of 4.0 to 5.0. In other words, they were around 3.0. The lowest among these mean scores was 3.2.

Positive views were reflected on ten statements where the highest mean score was 4.7. This score related to statement 6(ii)d.

Table 3 shows the mean scores of all the statements. In this table it should be noted that apart from the lowest mean score which was for statement 6(v), the rest of the mean scores which were found to be below the range of 4.0 to 5.0 were only slightly outside this range.

Figure 5 shows all the mean scores and how they can be related to each other; particularly the highest and the lowest. The information in this figure can also be related to that in table 3 where details surrounding each mean score are given.

Details, in terms of frequency distribution on the highest and the lowest mean score are shown in figures 6 and 7 respectively.

Table 3. All mean scores and related details, item 6, Questionnaire (B)

NO. *	MEAN	STD. DEV. #	MIN. SCORE	MAX. SCORE	RANGE	COUNT
6.(i)	3.6	0.9	1	5	4	96
6.(ii)a.	4.6	0.5	4	5	1	96
6.(ii)b.	4.6	0.5	4	5	1	96
6.(ii)c.	4.7	0.5	4	5	1	96
6.(ii)d.	4.7	0.5	4	5	1	96
6.(ii)e.	4.6	0.5	4	5	1	96
6.(ii)f.	4.6	0.5	4	5	1	96
6.(iii)a.	3.6	1.1	1	5	4	96
6.(iii)b.	3.6	1.1	1	5	4	96
6.(iii)c.	4.0	1.0	1	5	4	96
6.(iii)d.	3.9	0.9	1	5	4	96
6.(iii)e.	3.4	1.2	1	5	4	96
6.(iv)	4.6	0.8	1	5	4	96
6.(v)	3.2	1.3	1	5	4	96
6.(vi)	3.9	0.9	1	5	4	96
6.(vii)	3.4	1.2	1	5	4	96
6.(viii)	4.1	1.1	1	5	4	96
6.(ix)	4.3	0.8	2	5	3	96

KEY.

- * - This refers to statement numbers as given in Questionnaire (B).
- # - Standard Deviation.
- Min. - Minimum.
- Max. - Maximum.

Note: Although statements 6(ii)c. and 6(ii)d. have the same mean score of 4.7, taken to three decimal places, statement 6(ii)d. has a higher mean score. The respective mean scores for these statements are as follows; 4.667 and 4.677 (to three decimal places as given by STATVIEW 512+TM data base).

STATEMENTS

- 6.(i) Before I left college for teaching practice last year, I was very well informed about the situation in secondary schools regarding curricula and syllabi.
- 6.(ii) From my experience during teaching practice, the following elements of my course are very important:
 - (a) Practical project work;
 - (b) Allied theory;
 - (c) Applied Education;
 - (d) Theory of Education;
 - (e) Peer group teaching; and
 - (f) Audio-visual Aids.
- 6.(iii) During my teaching practice last year, I did not have any problems with the following:
 - (a) understanding the school organization;
 - (b) school administration;
 - (c) working with the school staff (including the headmaster);
 - (d) working with and understanding pupils; and,
 - (e) new tools, new machines and other new equipment ('NEW', meaning what you had never used before).
- 6.(iv) Teaching practice is a very important part of my course.
- 6.(v) Considering the amount of work that I had to cover, the time that I had was quite enough.
- 6.(vi) Most of the work that I had covered in college before going out was very relevant and useful during my teaching practice.
- 6.(vii) I was very pleased with the way that I was assessed during teaching practice.
- 6.(viii) Compared to the workshop (s) that I was using during teaching practice, the capacity of the college workshop(s) is quite satisfactory in terms of facilities.
- 6.(ix) Now that I am almost on my way to another period of teaching practice, I feel fully prepared after the work covered during the course of this year.

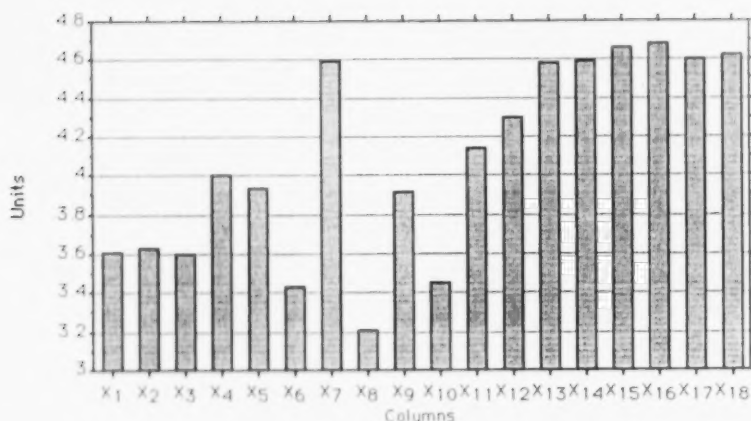


Figure 5. All the mean scores for statements 6.(i) to 6.(ix)

KEY:

Variable	Statement	Variable	Statement	Variable	Statement
x1	6(i)	x2	6(iii)a	x3	6(iii)b.
x4	6(iii)c.	x5	6(iii)d.	x6	6(iii)e.
x7	6(iv)	x8	6(v)	x9	6(vi)
x10	6(vii)	x11	6(viii)	x12	6(ix)
x13	6(ii)a.	x14	6(ii)b.	x15	6(ii)c.
x16	6(ii)d.	x17	6(ii)e.	x18	6(ii)f.

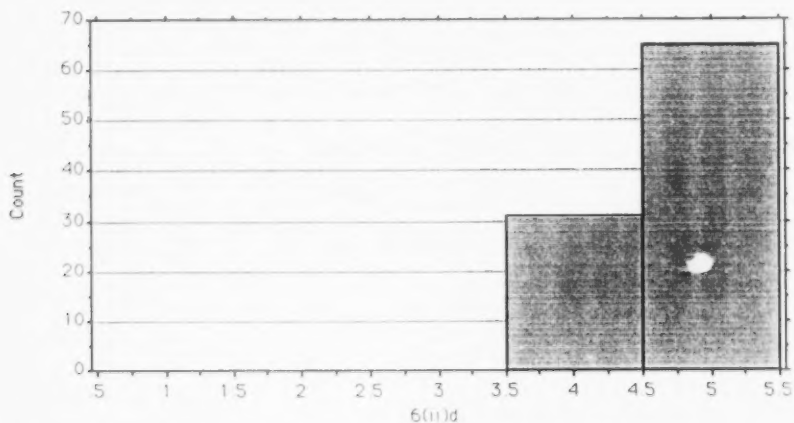


Figure 6. Frequency distribution for the highest mean in Figure 5

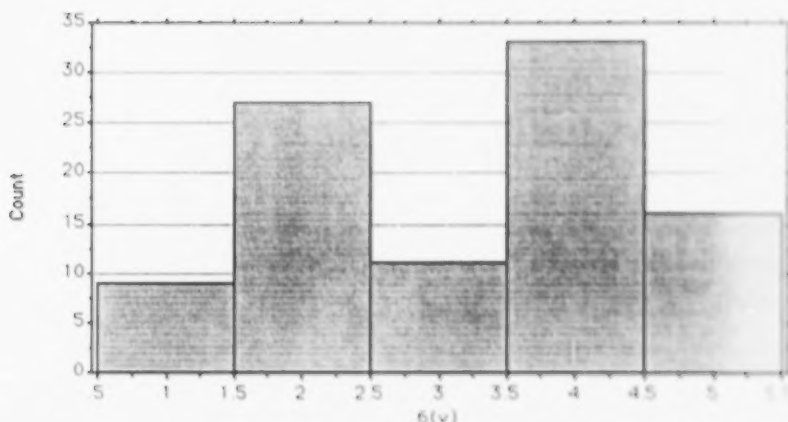


Figure 7. Frequency distribution for the lowest mean in Figure 5

7. What are the views of the serving teachers on the B.Ed. program at the university, regarding the nature and value or relevance of the course or courses they are undergoing?

On the whole, only two of the eight statements; 9(iii) and 9(iv), reflected negative views. The serving teachers showed that they did not agree with these statements. According to their responses to statement 9(iii), the capacity of their workshop facilities was not satisfactory, compared to that of an average school workshop. In this case, they also considered the challenges awaiting them on completion of their course of studies. On 9(iv), they indicated that the time they spent on the program was not sufficient considering the amount work they had to cover. With mean scores at 2.6 and 2.8, the views on these statements were considered negative since they fell far below the range of 4.0 to 5.0. However, both were approaching the range of indecision.

The rest of the statements were positively perceived.

On the whole, the lowest mean score was 2.6 while the highest was 4.7. It is possible to compare these two to each other and relate them to the rest of the mean scores in figure 8. More details concerning individual mean scores are given in table 4.

Figures 9 and 10 show the frequency distributions of the highest and the lowest mean score respectively. Such details, together with those in table 4 are a good explanation of how each mean score was arrived at.

Table 4. All mean scores and related details, item 9, Questionnaire (D)

NO *	MEAN	STD. DEV. #	SCORES		RANGE	COUNT
			Min.	Max.		
9.(i)	4.5	0.6	3	5	2	36
9.(ii)a.	4.2	0.8	2	5	3	36
9.(ii)b.	4.5	0.5	4	5	1	36
9.(ii)c.	4.7	0.5	4	5	1	36
9.(ii)d.	4.6	0.5	4	5	1	36
9.(ii)e.	4.6	0.5	4	5	1	36
9.(iii)	2.6	1.3	1	5	4	36
9.(iv)	2.8	1.2	1	5	4	36
9.(v)	4.4	0.6	3	5	2	36
9.(vi)	4.6	0.5	4	5	1	36
9.(vii)	4.1	0.5	3	5	2	36

KEY

- * - This refers to statement numbers as given in Questionnaire (D).
 # - Standard Deviation.
 Min. - Minimum.
 Max. - Maximum.

STATEMENTS

- 9.(i) My initial teacher training was relevant to my professional development as a technical-subject teacher.
- 9.(ii) In view of the professional challenges awaiting me on completion of this course, the work I am covering in this program is very relevant and appropriate. This work includes the following elements:
- (a) Prerequisite courses;
 - (b) Content courses;
 - (c) Curriculum courses;
 - (d) Teaching methods, and
 - (e) Project display and exhibition.
- 9.(iii) Considering the capacity of an average school workshop and the challenges that I am going to meet after my training in this program, the workshop(s) we are using is/are adequately equipped in terms of tools, machines and other workshop facilities.
- 9.(iv) Considering the amount of work that we have to cover, the time we spend on this program is quite sufficient.

- 9.(v) Project work (Extended essay or Depth-study) is a very important element of this course.
 9.(vi) Study Visits are a very important part of this course.
 9.(vii) This course is quite in agreement with my expectations, in terms of knowledge and skills.

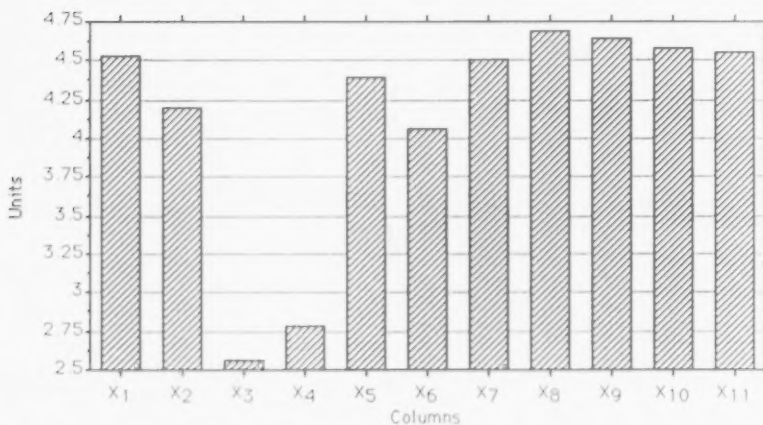


Figure 8. All mean scores for statements 9.(i) to 9.(vii)

KEY:

Variable	Statement	Variable	Statement	Variable	Statement
x1	9(i)	x2	9(ii)a.	x3	9(iii)
x4	9(iv)	x5	9(v)	x6	9(vii)
x7	9(ii)b.	x8	9(ii)c.	x9	9(ii)d.
x10	9(ii)e.	x11	9(vi)		

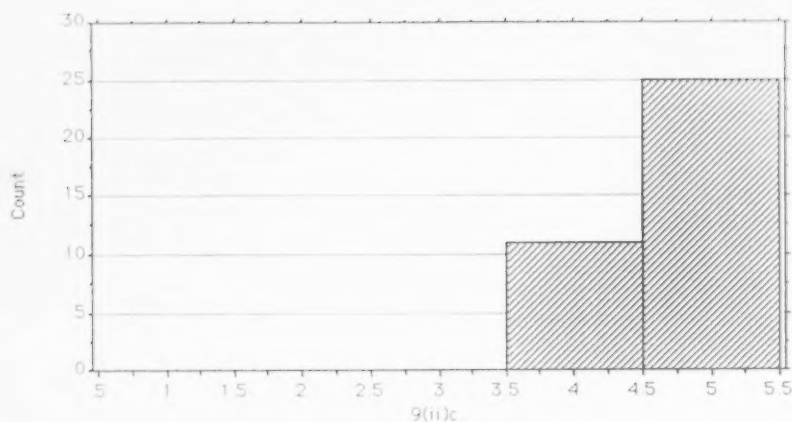


Figure 9. Frequency distribution for the highest mean in Figure 8

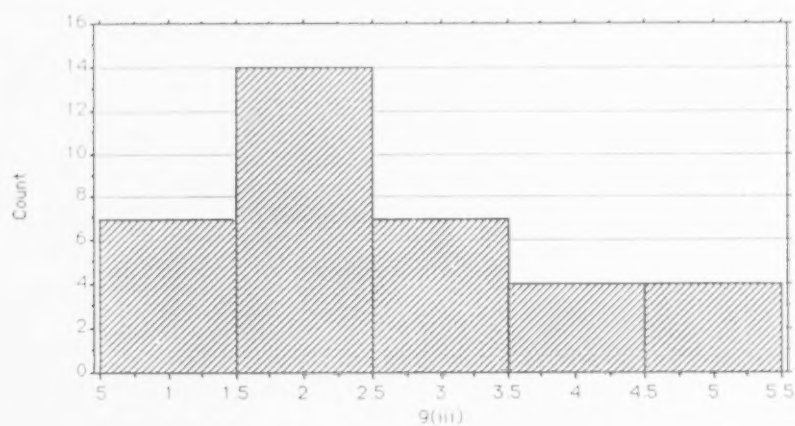


Figure 10. Frequency distribution for the lowest mean in Figure 8

8. What are the views of lecturers at Belvedere regarding certain elements of the Zimbabwean Educational System, the capacity of their workshops, the nature and value or relevance of the courses they are involved in and so on?

Since there were two items on which the lecturers in this category indicated how they perceived particular elements as represented by two sets of statements, results here are also presented in two sets. The two items, numbered 3 and 6 according to Questionnaire (C), had seven components each.

(a) Views on item 3

On this item, there was only one case where respondents disagreed with a given statement. They indicated that they were not well informed about the 'A' Level syllabus meant for technical subjects. The mean score here was 2.8; which happened to be the lowest on the whole list of statements. Despite being so close to 3.0, this score was still considered within the negative range.

Next to the above mean score, were the following; 3.5 and 3.6, which were considered cases of indecision. This was so because they featured around 3.0 and somewhat below the range of 4.0 to 5.0. According to the number system on the questionnaire, these mean scores pertained to statements 3(ii) and 3(iv) respectively.

Lastly, four statements were positively perceived and the highest mean score on these was 4.9. This score was also the highest of the whole list.

Table 5 contains some of the details surrounding each mean score. Such details are very important for the purpose of understanding how each mean score was achieved.

Figure 11 relates all the mean scores to each other, from the highest to the lowest. Using the details in this figure and those in table 5, it is possible to make comparisons between the mean scores; of particular interest being the difference the between the highest and the lowest.

In addition to the information and details in table 5 and figure 10, figures 12 and 13 provide more information relating to the highest and the lowest mean scores respectively. Both figures show the frequency distribution in each case.

Table 5. All mean scores and related details, item 3, Questionnaire (C)

NO. *	MEAN	STD. DEV. #	SCORES		RANGE	COUNT
			Min.	Max.		
3.(i)	4.3	0.6	3	5	2	11
3.(ii)	3.5	1.4	1	5	4	11
3.(iii)a.	4.8	0.4	4	5	1	11
3.(iii)b.	4.9	0.3	4	5	1	11
3.(iii)c.	2.8	1.4	1	5	4	11
3.(iv)	3.6	1.3	1	5	4	11
3.(v)	4.4	0.9	2	5	3	11

KEY.

* - This refers to the statement numbers as given in Questionnaire (C).

- Standard Deviation.

Min. - Minimum.

Max. - Maximum.

STATEMENTS

- 3.(i) I am quite well informed about the current changes within the Zimbabwean Educational system; particularly the recent move to vocationalize the teaching of technical subjects at secondary school level.
- 3.(ii) The move to vocationalize the teaching of technical subjects is already having an impact on the teacher training program (s) in this college.
- 3.(iii)a. I am very well informed about the following syllabi as followed in secondary schools in the teaching of technical subjects, particularly my subject area :
 (a) Z.J.C. (Zimbabwe Junior Certificate);
 (b) 'O' Level, and,
 (c) 'A' Level.
- 3.(iv) Referring to my subject area, I find the content in college similar to that in most schools, in terms of knowledge and skills.
- 3.(v) In my opinion, this college has the capacity to handle upgrading (in-service) courses for technical-subject teachers.

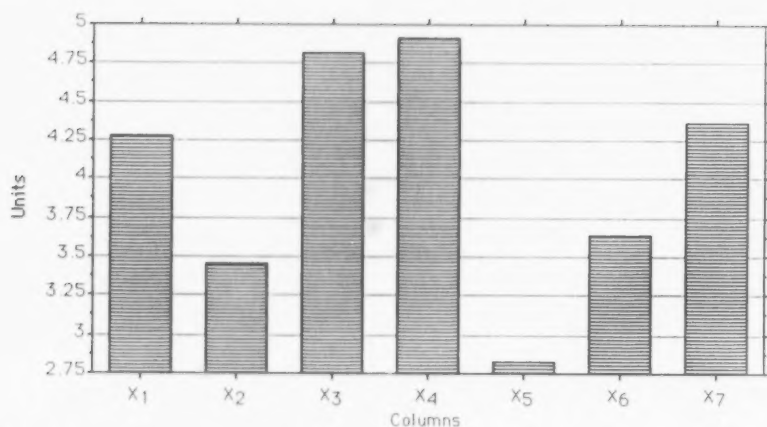


Figure 11. All mean scores for statements 3.(i) to 3.(v).

KEY:

Variable	Statement	Variable	Statement	Variable	Statement
x1	3(i)	x2	3(ii)	x3	3(iii)a.
x4	3(iii)b.	x5	3(iii)c.	x6	3(iv)
x7	3(v)				

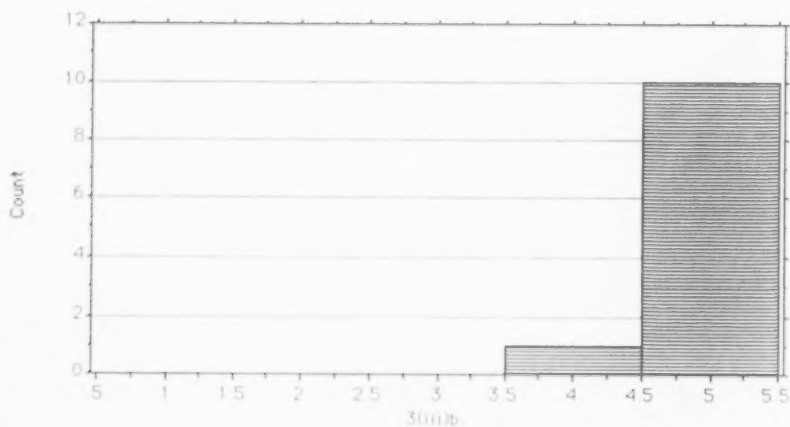


Figure 12. Frequency distribution for the highest mean in Figure 11

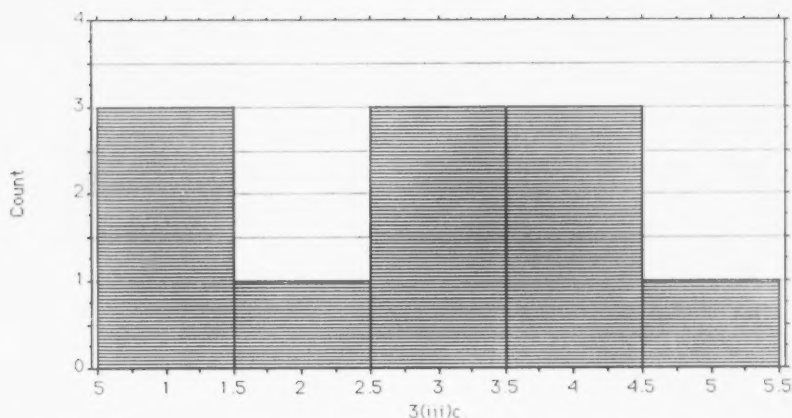


Figure 13. Frequency distribution for the lowest mean in Figure 11

(b) Views on item 6

From seven statements, there was only one case of indecision when the mean score for statement 6(iv) fell below the range of 4.0 to 5.0. This was very slightly so. A mean score of 3.9, shows how close this was to the positive range. Since this score was the lowest of the whole list, no negative views were held.

Very positive views were held on the remaining six of the statements where the highest mean score was 5.0. This was also the highest of the list. All respondents strongly agreed that Teaching Practice was an important element in teacher training.

Table 6 contains additional information on each mean score. In fact, this information is important where one needs to understand how each mean score came about.

Figure 14 gives the whole range of mean scores as represented by a bar chart. This chart relates all the mean scores to each other.

Figures 15 and 16 give details relating to the frequency distribution for the highest and the lowest mean scores.

Table 6. All mean scores and related details, item 6, Questionnaire (C)

NO *	MEAN	STD. DEV. #	SCORES		RANGE	COUNT
			Min.	Max.		
6 (i)	5.0	0	5	5	0	11
6 (ii)	4.1	1.3	1	5	4	11
6 (iii)	4.5	0.8	3	5	2	11
6 (iv)	3.9	0.3	3	4	1	11
6 (v)	4.0	1.3	2	5	3	11
6 (vi)	4.8	0.4	4	5	1	11
6 (vii)	4.1	0.5	3	5	2	11

KEY.

* - This refers to the statement numbers as given in Questionnaire (C).

- Standard Deviation.

Min. - Minimum.

Max. - Maximum.

STATEMENTS

- 6.(i) Generally, teaching practice is a very necessary and important component of teacher training.
- 6.(ii) The time allocated for this exercise in this college is quite adequate.
- 6.(iii) Most of the work covered in college before students go out on teaching practice is quite relevant and important during their time in schools.
- 6.(iv) In most cases the teachers in schools have been very helpful to students on teaching practice by way of supervision and advice.
- 6.(v) Compared to the capacity of an average school workshop; that of the college workshop (s) is quite adequate, in terms of equipment and other facilities.
- 6.(vi) It is important to establish links between some of the activities in this college and those of the Curriculum Development Unit with particular reference to technical subjects.
- 6.(vii) Some of the activities in this college are closely related to those being followed on the B.Ed. program at U.Z., regarding the area of teacher training.

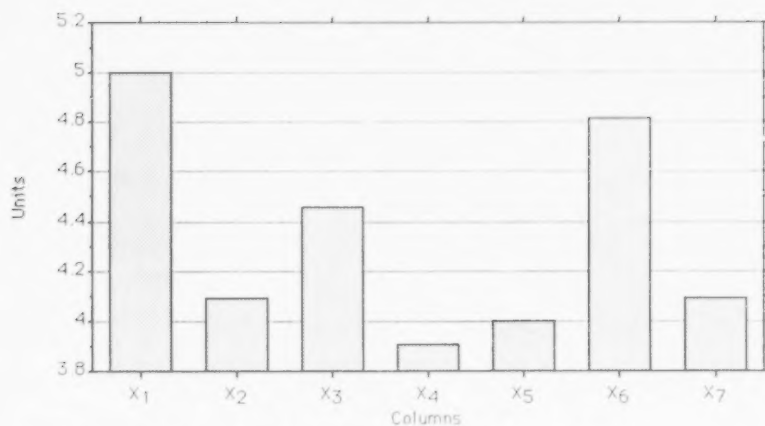


Figure 14. All mean scores for statements 6.(i) to 6.(vii)

KEY:

Variable	Statement	Variable	Statement	Variable	Statement
x1	6(i)	x2	6(ii)	x3	6(iii)
x4	6(iv)	x5	6(v)	x6	6(vi)
x7	6(vii)				

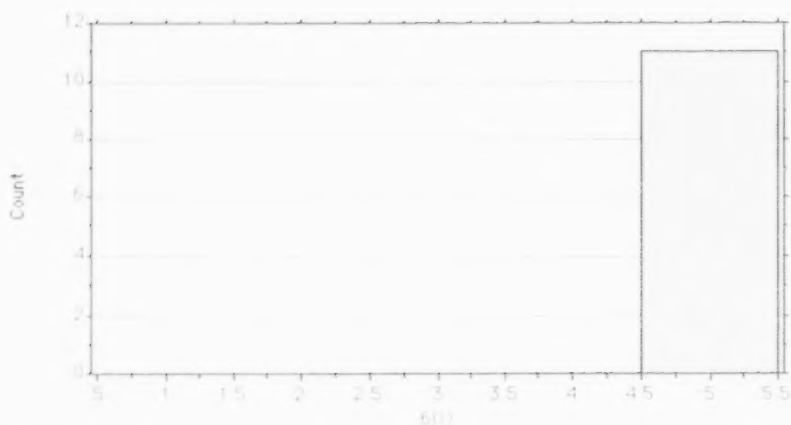


Figure 15. Frequency distribution for the highest mean in Figure 14

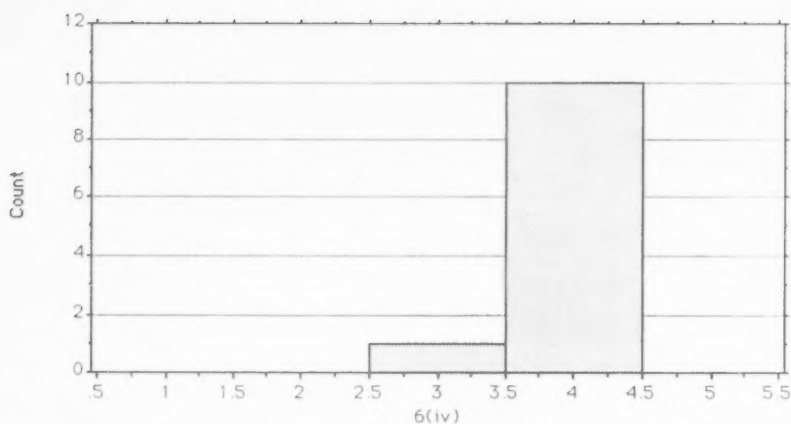


Figure 16. Frequency distribution for the lowest mean in Figure 14

9. What are the views of lecturers at the university regarding certain elements of the Zimbabwean Educational System, the capacity of their workshops, the nature and value or relevance of the courses they are involved in and so on?

From a total of ten statements, three reflected negative views. According to the number system on Questionnaire (E), these statements included; 2(iii)c. with a mean score of 1.0, 2 (v) with a mean score of 1.3 and 2(vii) also with a mean score of 1.3. These mean scores indicated that the respondents strongly disagreed with the given statements. The lowest mean score among these three was the lowest of the whole list.

Only on one statement was indecision reflected. This was on statement 2(viii) where the mean score was 3.3. This mean score came very close to 3.0 and far from either the range of 1.0 to 2.0 or 4.0 to 5.0. This indicated that lecturers were not quite sure of how their workshop facilities compared to those of an average school workshop.

Six of the statements were positively perceived, and the highest mean score was 5.0. Lecturers strongly agreed that Depth Study (Project Work) was very important in terms of knowledge building. According to the number system on the questionnaire, this was on statement 2(vi). In fact, this mean score was the highest on the whole list of statements.

Figure 17 shows all the mean scores in a bar chart and it is interesting to relate and compare them to each other; particularly the highest and the lowest.

Figures 18 and 19 give a close view of what is within the highest and the lowest mean scores. They show the respective frequency distributions.

More information relating to each mean score, from the highest to the lowest, is displayed in table 7. A close look shows how each mean score was arrived at.

Table 7. All mean scores and related details, item 2, Questionnaire (E)

NO. *	MEAN	STD. DEV. #	SCORES		RANGE	COUNT
			Min.	Max.		
2.(i)	4.3	0.6	4	5	1	3
2.(ii)	4.3	1.2	3	5	2	3
2.(iii)a.	4.7	0.6	4	5	1	3
2.(iii)b.	4.7	0.6	4	5	1	3
2.(iii)c.	1.0	0	1	1	0	3
2.(iv)	4.7	0.6	4	5	1	3
2.(v)	1.3	0.6	1	2	1	3
2.(vi)	5.0	0	5	5	0	3
2.(vii)	1.3	0.6	1	2	1	3
2.(viii)	3.3	1.2	2	4	2	3

KEY.

* - This refers to statement numbers as given in Questionnaire (E).

- Standard Deviation.

Min. - Minimum.

Max. - Maximum.

STATEMENTS

- 2.(i) I am well informed about the Zimbabwean Educational system; particularly the move to vocationalize the teaching of technical subjects at secondary school level.
- 2.(ii) The current changes in the system regarding the teaching of technical subjects in secondary schools have already started having an impact on this teacher training program in respect of subject content.
- 2.(iii) I am quite familiar with the syllabi being followed in the teaching of technical subjects at the following levels:
 - (a) Z.J.C. (Zimbabwe Junior Certificate);
 - (b) 'O' Level; and,
 - (c) 'A' Level.

- 2.(iv) In view of the syllabi and other activities covered in the teaching of technical subjects in secondary schools, the activities in this teacher training program are quite relevant in terms of knowledge and skills.
- 2.(v) Considering the amount of work that we have to cover with particular groups in this program, the amount of time we spend is quite enough.
- 2.(vi) The Depth Studies (Project work) done by students are very important in terms of knowledge building in the Zimbabwean Educational system; particularly for the development of technical subjects.
- 2.(vii) Regarding the upgrading of teachers in schools through this program, the capacity of this institution, in terms of manpower and facilities, is quite satisfactory.
- 2.(viii) Considering the capacity of an average school workshop, in terms of facilities (tools, machines and other equipment); that of the workshop(s) in this institution is quite adequate.

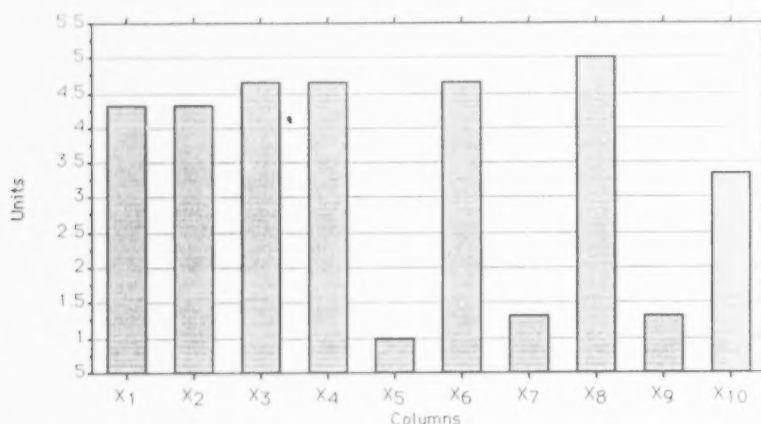


Figure 17. Mean scores for all statements, from 2.(i) to 2.(viii)

KEY.

Variable	Statement	Variable	Statement	Variable	Statement
x1	2(i)	x2	2(ii)	x3	2(iii)a.
x4	2(iii)b.	x5	2(iii)c.	x6	2(iv)
x7	2(v)	x8	2(vi)	x9	2(vii)
x10	2(viii)				

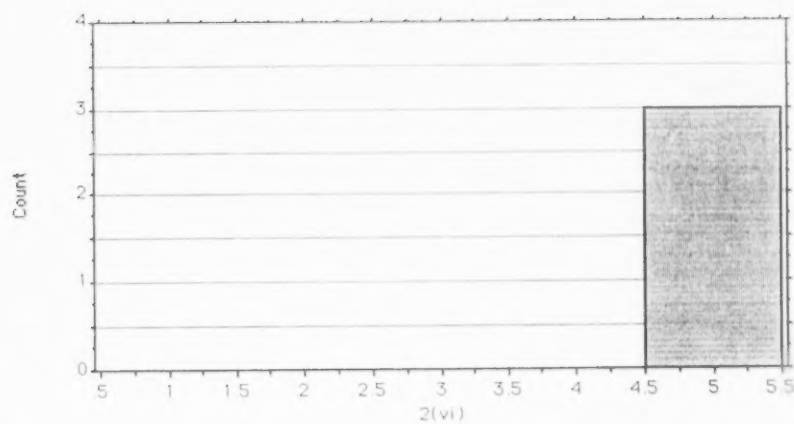


Figure 18. Frequency distribution for the highest mean in Figure 17

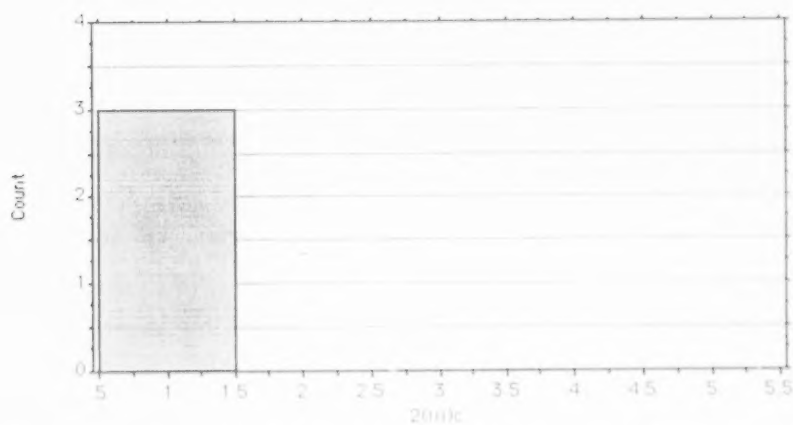
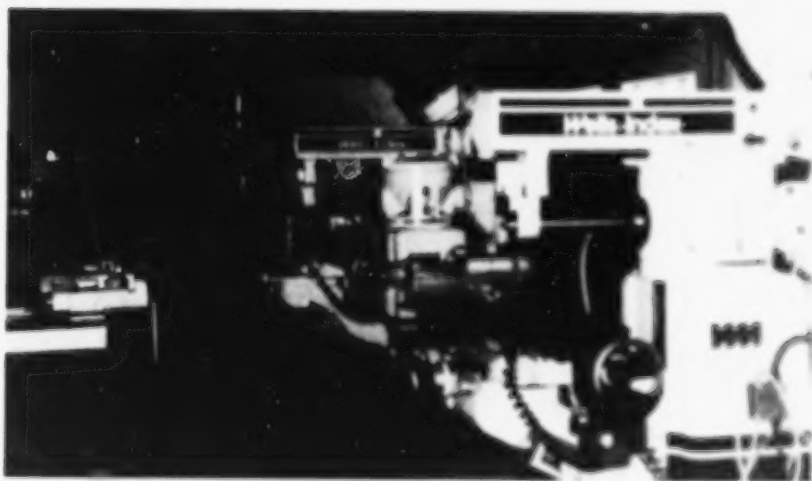
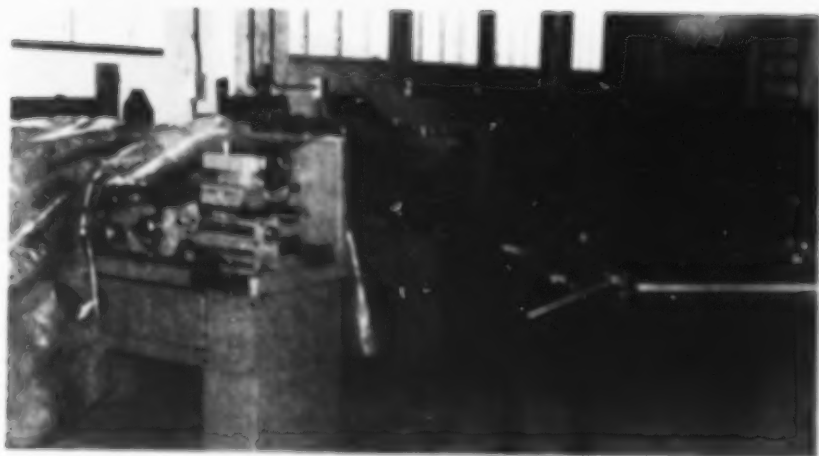


Figure 19. Frequency distribution for the lowest mean in Figure 17

PLATE (1). Some of the new machines supplied to Belvedere in 1986



A gang of milling machines



A gang of metalwork centre lathes

PLATE (2). On display, some the work produced by B.Ed. students



A wood turning lathe, chair and other projects - (Metalwork)



*A student explaining
the function of one of
the parts on his
project - (Metalwork)*

PLATE (2). (Continued)



Woodwork and Building projects



This was a group project - (Building)

PLATE (3). On display, some of the work produced by students at Belvedere



Projects produced by third year students - (Building)



The student who designed and made this project combined his knowledge of electronics and of woodwork to produce this device which can be used to monitor building structures

PLATE (3). - (Continued)



Above: A Woodwork student with his major project



Metalwork students
showing a water pump.
The one to the right
is the owner of the
project

PLATE (4). The impact of the design approach



The model (mock-up) of a pair of bench-shears and the finished product



The mock-up of a grain sieve

PLATE (4). - (Continued)



The model (mock-up) of a windmill and the finished product



PLATE (5). Practical examinations at Belvedere



Third year students - (Metalwork)



First year students - (Metalwork)

PLATE (5). - (Continued)



Third year students - (Woodwork)



First year students - (Building)

PLATE (6). A moment to share ideas at Belvedere



These two ladies are specializing in Woodwork. They did not study technical subjects at secondary school level and are seen here struggling to square the corners of this box construction.

On the whole, 57 % of the first year students indicated that they had studied technical/practical subjects at secondary school level while 43 % indicated that they had not. This was according to item 3(i) in Questionnaire (A). - [See Figure 23 Appendices (i) and (xix) d.]

Out of those who had studied these subjects, 24 % had studied either Fashion and Fabrics, Food and Nutrition or Agriculture. Only 33% of the students had a background in either Metalwork, Woodwork or Building. - [see item 3(ii), Questionnaire (A), Appendix (i)]

5. SUMMARY, CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This chapter presents a summary of the following: *purpose of study*, from Chapter 1; *literature review*, from Chapter 2; *methodology*, from Chapter 3; and *results*, from Chapter 4. In addition, *conclusions* based on the findings of the study are presented and discussed. Finally, *recommendations* are made for further research and other related activities.

5.01 Summary.

(a) Purpose of study (Chapter 1)

The purpose of this study was, 'to determine the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more vocationally oriented.'

The primary research question answered by this study was: 'To what extent are current teacher training programs in tertiary institutions being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more vocationally oriented?'

The nine secondary research questions addressed by this study were:

1. What measures or steps have so far been taken, or are being taken by the institutions involved in the training of technical-subject teachers to gear their programs towards the present secondary school curricula?

2.(i) If anything has been done or is being done, what difficulties have been, are being or could be faced in the process? (ii) And if there are any

problems already existing or anticipated, what efforts have been made or are being made either to solve or to prevent them?

3.(i) Is there or has there been a need to upgrade staff already in service?
(ii) If so, what efforts have been or are being made to meet the need?

4.(i) If anything is being done or has been done to meet the need, what problems have been, are being, or could be faced in the process and what are, or could be possible solutions? (ii) And, where particular solutions could have been tried in solving certain problems, what has been the outcome?

5. To what extent have activities at C.D.U., B.T.C. and U.Z. been linked, regarding the development of curricula and the training of technical-subject teachers?

6. What are the views of student teachers undergoing initial teacher training, regarding the nature and value or relevance of the preparation they have in college before going into schools?

7. What are the views of the serving teachers in the B.Ed. program at the university, regarding the nature and value or relevance of the course or courses they are undergoing?

8. What are the views of lecturers at Belvedere regarding certain elements of the Zimbabwean Educational System, the capacity of their workshops, the nature and value or relevance of the courses they are involved in and so on?

9. What are the views of lecturers at the university regarding certain elements of the Zimbabwean Educational System, the capacity of their workshops, the nature and value or relevance of the courses they are involved in and so on?

(b) Literature review (Chapter 2)

A review of literature resulted in the identification of several aspects relating to teacher training. Three prominent themes emerged: (1) The context of educational reform and policy; (2) the concept of vocational education; and, (3) The question of teacher education/training.

Two main patterns of educational reform were identified; 'radical' and 'continuous' or 'gradual'. The model on which the whole of this study is based, 'The Cross Model', came into focus. (see Figure 1 in Chapter 2)

On 'vocational education', the experiences of several countries were brought into perspective. Apart from the Soviet Union and the United States, five other countries were also considered.

The research problem surfaced into context under 'teacher education'. The idea was to relate the whole theoretical background to the research problem which referred to the pressing need to study and gain an understanding of, 'the extent to which the current teacher training programs in tertiary institutions are being geared towards the preparation of teachers for the realities existing, regarding their tasks in secondary schools where the teaching of technical subjects is becoming more and more vocationally oriented'.

It was found necessary to place 'Education' and 'Training' into context through a conceptual framework based on a philosophical outlook.

(c) Methodology (Chapter 3)

(i) **The population** The study concentrated on student teachers undergoing initial teacher training at Belvedere and serving teachers on the B.Ed. program at the university. Lecturers and C.D.U. officers were also included. Metalwork, Woodwork and Building were subjects of interest.

Sample size and selection The population was divided into these categories: (a) First year students; (b) Third year students; (c) serving teachers, and (d) Lecturers.

The sample size was as follows: 100 First year students, from a total of 220; 100 Third year students out of 250; all the 15 lecturers from Belvedere; 36 B.ed. students out of 56 and all the three lecturers from the University.

Instrumentation The instruments for this study were: questionnaires (A) to (E); interview schedules (A) to (F), and three workshop check-lists covering three departments. (Metalwork, Woodwork and Building)

The development of questionnaires and interview schedules It was found necessary to construct questionnaires and interview schedules which were not only valid, but also reliable.

'Content validity' was established with the help of a panel of experts, who also happened to be subject-specialists.

Specifically, the experts were asked to review all the potential questionnaire and interview-schedule items and to indicate: (i) whether the items represented views that could be held by lecturers and students involved or engaged in teacher training programs; and, (ii) whether the type of information or knowledge sought through the instruments was of any significance in the development of the whole study.

As a result of feedback from the experts, several items were either modified or dropped altogether. There was a lot of constructive criticism.

A pilot study was then conducted to establish 'instrument reliability'. Ten student teachers and four lecturers were used. The response rate was 100 %.

Analysis of data Data were analysed to answer the research questions. STATVIEW 512+TM, a Macintosh computer program was used. This produced the desired descriptive statistics; for example, the mean, standard deviation and frequency distribution.

(d) Results and findings (Chapter 4)

This study was designed in such a way that the answers to the nine secondary research questions were meant to contribute towards the comprehensive answer of the primary research question. Therefore, one could argue that the primary research question was answered at nine levels relating to the nine secondary research questions.

The questionnaire return rate and the responses during all the interviews were favourable despite a few difficulties.

The main problem was in the timing of the study. According to the given conditions, the study was either done then, or never! The timing was unfortunate. Those on the B.Ed. program had completed their examinations and had already left for the Christmas holidays. At Belvedere they were still busy with end of year examinations. In fact, there were moments where one felt that the atmosphere was not conducive to the requirements of the study. After certain examination papers, some of the students; particularly third years, were not in the mood to attend interviews or respond to questionnaires. Even where they did, there were cases where one could see that they only rushed through in order to do away with the whole thing. Actually, some of the students, both from Belvedere and the university were not in the right frame of mind. There was a lot of course assessment going on and most of those concerned were worried in case things turned bad for them. For example,

every student was having to present projects on a major display from which a very important mark was supposed to be drawn.

However, to go around this problem, a number of measures were taken, and, these included the following:

- (i) inflating the sample size, in order to get as much information as possible.
- (ii) working after hours and even during week-ends.
- (iii) including a number of unstructured interviews. And,
- (iv) seeking the help of lecturers, particularly in cases where it was difficult to get in touch with certain groups of students.

It was also fortunate that the R.Ed. students came back to collect the projects they had left on display. Questionnaires and interview schedules were completed during that time. Where subjects had no time to respond to questionnaires or attend to formal interviews, the best that could be done had to be through unstructured interviews.

On the whole, lecturers, students and C.D.U. officers cooperated very well. They appreciated the importance of the study, both, for the researcher, and for the whole area of technical subjects in *Zimbabwe* where their professional development was also part. Most of them made this point clear during interviews.

Several findings were made. Relating to the nine secondary research questions.

Question 1 This question related to the measures already taken or still being taken by both, the college and the university to gear their programs towards the present secondary school curricula.

The following were reported a:

- (i) continuous revision and modification of syllabi,
- (ii) continuous efforts to introduce and/or incorporate Design and Technology approaches in teaching,
- (iii) the acquisition of more advanced equipment, particularly machinery,
- (iv) efforts to secure more relevant and appropriate course literature, and,

- (v) efforts to establish links with industry.

Question 2 This question was in two parts. Part (i) was about finding out what difficulties had been or were being encountered in the process where particular measures had been or were being taken under Question 1. Part (ii) involved finding out what efforts had been or were being made to solve existing problems or prevent anticipated problems.

Firstly, the following problems were spelt out:

- (i) Acute manpower shortages which have resulted in, (a) most lecturers overworking and failing to do enough lesson preparation (b) difficulties in the supervision of students on teaching practice, especially those too far away from Harare.
- (ii) Lack of information, where lecturers indicated that C.D.U., closely in touch with schools, did not give them enough information about curriculum changes;
- (iii) Some of the lecturers being reluctant to adopt the new approach of Design and Technology;
- (iv) Rigid examination systems, which hampered the development of 'Design and Technology';
- (v) Problems with spare parts for some of the new machines, especially those of inferior quality; and,
- (vi) Lack of foreign currency, where books needed to be imported.

Secondly, respective efforts were being made to solve the problems:

- (i) Not much has been done to solve this problem apart, in the case of Belvedere, from trying to have as many students as possible, doing teaching practice in schools in and around Harare. However, the problem of manpower shortages in both institutions is temporal since lecturers training either within the country or abroad are expected to return.
- (ii) As a possible solution to this problem, several lecturers have proposed the idea of regular meetings with staff at C.D.U. although very little had been done up to the time of this study.
- (iii) This problem did not exist at the university, probably because of different staffing. At Belvedere, efforts to improve the situation have

been through workshops and seminars where 'Design and Technology' has been the main subject of discussion. This has proved to be a very important means of communication between teachers and lecturers.

(iv) There was no indication of any particular solution being tried so far. This remains a challenge to all those concerned.

(v) Again, no solution was indicated. Another challenge!

(vi) Lack of foreign currency is a national issue. The lecturers concerned could not do much about it. They could only help themselves out by sharing what was available. Handouts have also proved useful.

Question 3 This question was in two parts. Part (i) involved finding out whether there was or had been a need to upgrade staff already in schools while part (ii) was about finding out what efforts were being made or had been made to meet the need.

Both C.D.U. officers interviewed, said that there was still a great need to upgrade the teaching force.

A lot has been done, starting with in-service courses at Gweru Teachers' College in 1976; before independence. At the end of 1979 these stopped. It was a period of stagnation in the upgrading of technical-subject teachers. Things began to improve in 1984 with the B.Ed. degree program in England, involving courses in Craft Design and Technology (C.D.T.). The B.Ed. program in technical subjects at the University of Zimbabwe three years later and the 1988-89 Masters' degree program in Sweden have also been great achievements.

Question 4 This question was in two parts: (i) was to find out what problems had been or were being encountered in efforts to upgrade staff and (ii) was to discover what the outcome had been, where something had been done to solve the problems.

Manpower shortages at the university seemed to affect the size of intake. This could be related to the shortage of other resources and facilities. Giving first preference to those who have been in service longest has been the partial solution.

Question 5 This question was aimed at finding out the extent to which C.D.U., B.T.C. and U.Z. had linked activities relating to curriculum development and teacher training.

No formal links exist between the three. But informally, Belvedere had more links with C.D.U. and U.Z. than the later pair had with each other.

Lack of communication appeared to be the main problem between C.D.U. and U.Z.

Question 6 This question was about the views of student teachers at Belvedere, regarding the nature and value or relevance of the preparation they have in college before going into schools. Part (a) was for first year students, while (b) was for third years.

First year students perceived positively of all the eight items in question. The lowest mean score of 4.0 showed that they agreed with the eight statements.

Third year students held positive views on ten of the eighteen statements in question and were undecided on eight.

Question 7 Under this question, one sought the views of serving teachers on the B.Ed. degree program at the university, regarding the nature and value or relevance of their course of studies.

Only two out of eight statements reflected negative views. The serving teachers indicated that their workshop facilities were not satisfactory and that they had too little time to do all the work required of them.

Question 8 This question related to the views of lecturers at Belvedere, regarding certain elements of the Zimbabwean educational system, the capacity of their workshop facilities, the nature and value or relevance of the courses they were involved in.

Questionnaire (C) had two items, (3 and 6) on which lecturers indicated how they perceived of particular elements as represented by two sets of statements. The items comprised of seven statements each.

(a) Views on item 3 There was only one case where respondents disagreed with a given statement. They were not well informed about the 'A' Level syllabi meant for their respective technical subject areas.

They were undecided on two statements. Mean scores of 3.5 and 3.6, on statements 3(ii) and 3(iv) showed that they were not sure whether the new education policy was already affecting programs in college and whether subject content in college was similar to that in schools.

Lastly, four statements were positively perceived and the highest mean score was 4.9 relating to statement 3(iii)b. which showed that the lecturers were well informed about the 'O' Level syllabi.

(b) **Views on item 6** The lowest mean score here was 3.9 which related to statement 6(iv). This showed that lecturers were not fully decided on the contribution of school teachers on teaching practice.

There were no cases of negative views and very positive views were held on the remaining six of the statements where the highest mean score was 5.0. Relating to statement 6(i), this mean score indicated that all lecturers strongly agreed that teaching practice was a very important element in teacher training.

Question 9 The question related to the views of lecturers at the university, regarding certain elements of the Zimbabwean educational system, the capacity of their workshop facilities, and the nature and value or relevance of the courses they taught. There were ten statements under item 2 in Questionnaire (E).

Negative views were reflected on three statements; 2(iii)c, 2(v) and 2(vii). The respective mean scores were recorded as 1.0, 1.3 and 1.3. Respondents strongly disagreed with the given statements.

There was one case of indecision where a mean score of 3.3 related to statement 2(viii). This indicated that the lecturers were not sure of how their workshop facilities compared to those of an average school workshop.

Six statements were positively perceived, and the highest mean score was 5.0. This meant that lecturers strongly agreed that Depth Study (Extended Essay) was very important in terms of knowledge building. This related to statement 2(vi).

5.02 Conclusions and discussion

Based upon the analysis of all data obtained through questionnaires, interviews, workshop check-lists and documents, the following conclusions were drawn:

1. Student teachers get enough preparation in college before going out into schools for teaching practice and on completion of their courses. This is reflected by the responses of both first and third year students in Questionnaires (A) and (B) respectively.

First year students held positive views on statement 8 (i) where the majority showed that they felt fully prepared for their on coming teaching

practice after their first year course of studies. This was despite the fact that they had never had a formal period of observation in schools. They thought the few visits they had made to some neighbouring schools had been enough to give them an idea of the situation in schools. In fact, 87 % held positive views, 11 % were not sure and only 2 % held negative views. - [See Figure 20 appendix (xix)]

Although third year students were not sure of the relevance and/or usefulness of the work they covered in college before going out on their last teaching practice, it was noted that a mean score of 3.9 on statement 6(vi) was very close to the positive range. - [See Figure 21 Appendix (xix)]. More important, was the response to statement 6(ix) where they showed that despite being undecided on statement 6(vi), they felt fully prepared for their fourth year teaching practice. This also suggested that a lot of relevant work had been covered in preparation for this T.P.

With both groups feeling so well prepared for their T.P., one could conclude that the same would probably follow when students finally went into schools after college.

Actually, this conclusion is in line with Raths and Katz's argument on teacher training (Raths and Katz, 1986). They maintain that systems must provide future teachers with training which conforms to new tasks defined in school reforms. Such preparation requires a high degree of flexibility on the part of trainees. Holding the same point of view, Razik (op. cit.) asserts that upon graduation, the trainee, now a professional teacher, should be recognized as an adaptive decision maker possessing both technical competence and a broad base for making instructional choices. In fact, as reflected in most literature, the key issue has been to do with the ability of the future teacher to integrate what s/he learns in a variety of settings. According to Myers and Reid (op. cit.), this has several implications: To what extent are the courses in the faculty of education related to those that the student takes outside the faculty? Within the faculty, to what extent are professional courses related to field experiences?

At this point, perhaps one could also refer to Taylor's argument as already presented in the second chapter. He affirms, it is in the context of rapid change that colleges of education and universities must produce the teachers for tomorrow, and it is against this background that the current programs in these institutions must be evaluated. (Taylor, op. cit.)

2. Despite lack of spare parts for some of the machines, the capacity of the workshops at Belvedere is quite satisfactory for the needs of students undergoing initial teacher training. This was reflected in Questionnaires;

(A), (B) and (C) through the responses of both, lecturers and students. - [see also, inventories - Appendix (xii)]

Since the respective mean scores of 4.0, 4.1 and 4.0 were within the positive range of 4.0 to 5.0, one could safely conclude that all parties found the facilities adequate for their requirements. This conclusion contradicts the usual assumption that in most developing countries, lack of facilities is common place.

3. Teaching practice is a very necessary and important component of initial teacher training. This conclusion is drawn from the responses of lecturers and third year students at Belvedere. Students responded to statement 6(iv) in Questionnaire (A) while lecturers responded to statement 6(i) in Questionnaire (C). The respective mean scores of 4.6 and 5.0 indicated that they held highly positive views towards statements relating to the relevance and/or importance of teaching practice.

According to Razik (op. cit.), once in the foundation phase, the trainee is exposed to the range of experiences needed for judging the nature of learning activities in schools. After the foundation phase, the trainee enters the laboratory phase. Here, under simulated conditions, s/he must successfully demonstrate competencies in all significant aspects of teaching (Razik, op. cit.). Razik holds that the instrumental system of the laboratory phase provides the trainee with opportunities, both to acquire knowledge about teaching and to use this knowledge through practice under laboratory conditions. The final stage, involving teaching practice, is under actual classroom conditions. Here, the trainee develops and strengthens the competencies he acquired in the foundation and laboratory phases (Razik, op. cit.). The importance of teaching practice lies in the fact that it is actually the period during which the trainee should demonstrate not only the technical competencies but a commitment to continuing self education. The importance of self education has already been stressed in most related literature in the second chapter where it has been pointed out that teachers of tomorrow should be trained in such a way that they are able to keep up with a period of rapid change.

4. In most cases, master teachers in schools are of great help to student teachers on teaching practice (T.P.). This conclusion relates to the responses of third year students and lecturers at Belvedere. Although lecturers were not quite sure of how far master teachers assisted students on teaching practice, all students interviewed indicated that they got a lot of help from the teachers, in the form of supervision and advice. While lecturers were found to be undecided about this issue, it is perhaps important to note that a mean score of 3.9 on statement 6(iv) in Questionnaire (C) was very close to the positive range of 4.0 to 5.0. (see figure 22, appendix (xix)). In fact, this conclusion was a result of a split

decision on the responses of the two parties; lecturers and students. The responses of students were eventually found more reliable.

The importance of such help is actually based on the assumption that teaching is also an art, and like any other art, its practical skills are acquired through performance under the guidance of a master. Myers and Reid (op. cit.) maintain that the nature of the supervision, more than anything else, determines whether the student is experiencing high quality internship or lower level apprenticeship. It could be argued, the main supervisory forces on students on T.P. are the teachers and principals in schools. The following statement from one university teacher education program is cited:

... the major advising and assessing roles belong to the master teachers (supervising school teachers) ... who know best the school situation in which they and the student are working. (Turney et. al., 1982 p.18)

Turney and others also point out that an increasing number of institutions rely heavily on the supervising teacher's evaluation report. This could be a useful idea for Belvedere where some of the students are deployed too far from college where it becomes difficult, if not impossible, for lecturers to visit them given the manpower shortages.

This idea suggests that co-operating teachers deserve help in preparing themselves for their supervisory roles. It also calls for more and closer co-operation between college lectures and staff in schools. Done properly, this would probably allow participants to share ideas as to how best one could assist a student on teaching practice and possibly, discuss other related issues. Most of the literature relating to the training of co-operating teachers is craft oriented. While many authors agree that special training and skills are needed, there is less agreement as to the precise content of that training. Quick (1967) specifies different categories of assets for co-operating teachers including; professional attitudes, professional abilities, human relations skills and personal habits. He also proposes several supervisory activities with which co-operating teachers need to be familiar. Among these are; evaluating student teachers through observation, providing specific feedback and constructive criticism, pointing out strengths and weaknesses, and relinquishing classroom control to the student teacher.

5. Initial teacher training makes a very important contribution towards the professional development of technical-subject teachers. A mean score of 4.5 on statement 9(i) in Questionnaire (D) showed that the serving teachers on the B.Ed. program held this view regarding their pre-service training.

This conclusion contradicts the findings of other similar studies on teacher education. For example, Joyce and Cliff (1984), conclude that, teachers believe that their initial training was (is) poor. Confirming this, Myers and Reid (op. cit.), also affirm that in the judgment of many student teachers, and indeed of many practising teachers, most pre-service training programs are a waste of time!

Feiman-Nemser (1983) argues that it is impossible to understand the impact of the pre-service preparation of teachers on teacher development without knowing what this preparation involves. For example in Sweden, according to OECD (op. cit.), the proposed system for teacher training was designed to provide the basic foundation for the professional development of teachers. Given the rapid changes in the Zimbabwean education system, as already indicated in the second chapter, such training can be no more than a general introduction, which later should be continuously developed and kept up to date by the teacher himself.

6. Considering the amount of work to be covered, the time spent on the B.Ed. program is not sufficient. This conclusion is drawn from the responses of both, students and lecturers as reflected in questionnaires (D) and (E). Specifically, students responded to statement 9(iv) and lecturers to 2(v). Respective mean scores of 2.8 and 1.3 indicated that both parties regarded the time spent on the program inadequate.

A similar problem was encountered in Finland in the 1970's, and to solve this problem, efforts were made to relate pre-service and in-service courses more closely. In this view, the two were not supposed to be alternatives, but complements. It was also suggested; the longer pre-service training became, the shorter in-service training became and vice versa (OECD-op. cit.).

In the case of the serving teachers at the University of Zimbabwe, the situation is slightly different. One should perhaps say, the more the work covered during initial training, the less the time should be spent on in-service programs. This means, at B.Ed. level one should avoid unnecessary breadth and instead, go into the depth of important topics. In other words, quality should precede quantity. Such an approach is likely to be more productive in cases where time is limited. The views reflected during interviews with both students and lecturers tended to suggest two possibilities; either the students had missed certain important skills in their pre-service training, or certain aspects of the B.Ed. program where of secondary importance, given the limit of time. To establish any particular position in this regard, one would need more information. This would probably require more time in a separate study.

7. Considering the need and demand to upgrade secondary school teachers, the capacity of the university is still very low, in terms of manpower and facilities.

The need for organised upgrading training can be seen from two view points; that of the education system and that of the individual (OECD-Sweden, *op. cit.*). In this case, it is mainly from the former.

This conclusion is based on the responses of lectures at the university. A mean score of 1.3 for statement 2(vii) in Questionnaire (E) indicates that lecturers regarded the capacity of the university, in this respect, too low. Severe competition for the limited places on every intake confirms this.

This conclusion is actually in line with the findings made by Tibbets and others. They argue that in most developing countries, physical facilities cannot cope with the number of teachers needed for service; training period may be too brief (as already indicated under conclusion 6), and teacher education curricula may be ineffectual (Tibbets, J. et. al, 1968). It is also pointed out, staff for training teachers may have had inadequate training themselves.

In the case of Zimbabwe, the high demand for places in the B.Ed. program could be explained in several ways. For example, since independence, policy makers have been much more concerned with recruiting new teachers than with renewing the professional skills of those already qualified (TERC Report, *op. cit.*). It now seems that emphasis is going to shift from pre-service to in-service programs.

There are important historical reasons why those involved in the profession have not developed a thorough and continuing program of professional development. In fact, teachers are not alone in tackling the problem; updating and upgrading have become issues of concern in all professions. With teaching now becoming largely a degree-based profession, there is likely to be a growing impetus towards further education on the part of a large segment of the teaching force in Zimbabwe. One way to meet this demand is to expand opportunities for graduate studies in education (Myers and Reid, *op. cit.*). While this suggestion is important, perhaps one should also consider the question of cost; particularly in our situation where financial resources are limited.

8. The rigid examination systems combined with teacher educators who are still reluctant to adopt the new approach are the main obstacle hindering the 'Design and Technology' approach. Interviews with lecturers at Belvedere and officers at C.D.U. made this clear.

This conclusion is consistent with the findings of other similar studies relating to teacher education within the context of educational reform. For example, as already revealed by the review of literature Lauglo and Lillis (op. cit.) cite a similar situation in Sierra Leone. Efforts made by some innovative teachers to transform the technical studies curriculum through a design-based approach were frustrated by the opposition from teachers and administrators reluctant to adopt the new approach.

9. The syllabi being followed at the university and at Belvedere are relevant and appropriate to the given levels of training. This conclusion is based on the responses of lecturers and students from both institutions.

According to Myers and Reid (op. cit.), any serious program for the professional training of teachers must reflect an interpretation of the nature of education. They also assert that, clarification is needed in the minds of those at colleges and universities as to what constitutes relevant pre-service and in-service programs.

A close analysis of the programs at Belvedere and those at the university indicates that pre-service teacher education gives more time to classroom experiences while in-service programs stress teachers sharing experiences.

In a way, this conclusion is a sign of hope at a time when according to Myers and Reid (op. cit.), all educational institutions, at all levels, are being criticised for their lack of relevance to the real world. A good example is a recent case of several colleges closing down in the Soviet Union this year after allegations of low standards. (Radio Moscow, World News, 03-04-88)

10. A lot still needs to be done at Belvedere to raise standards at intake levels. This conclusion is derived from the responses of first year students on item 3, in Questionnaire (A).

A large proportion, if not the majority, of the technical-subject students at Belvedere do not have the relevant pre-entry training.

For a college like Belvedere, the only one of its kind in Zimbabwe specializing in the training of technical subject teachers, this is a very unfortunate situation. Most lecturers expressed great concern. They said that a lot of time was being spent trying to bring inexperienced students to acceptable levels of technical knowledge.

Actually, this conclusion is consistent with Joyce and Cliff's allegation that teacher education draws poor students (Joyce and Cliff, op. cit.). They call for adjustments in entrance standards.

According to Taylor (op. cit.), society is necessarily concerned with the way teachers are selected, trained and certified; although responsibilities are sometimes delegated to largely independent bodies, such as universities and individual colleges. In most cases, even though, a fairly close oversight is maintained by agencies of political and social control at national level. (Taylor, op. cit.)

11. More relevant and appropriate literature is still required at the university for use in the B.Ed. program. Both lecturers and students made this clear in questionnaires and during interviews.

Most of the books are the ones used in schools with Forms One to Four. Now, since the B.Ed. syllabi include more advanced work, for example material that could be included at 'A' Level and even tertiary levels, one would question the appropriateness of most of the literature. In other words, some of the literature could be relevant, but not appropriate. There were too few books anyway, considering the demand.

This conclusion is consistent with Zajda's findings in the Soviet Union. He alleges that most of the literature used in most colleges of education, is both inferior and inappropriate. (Zajda, op. cit.)

12. At the moment, there is very little co-ordination of activities Between Belvedere, University and C.D.U. There are no official links. This was pointed out during interviews with lecturers and C.D.U. officers.

Myers and Reid (op. cit.) propose a co-operative approach to teacher education. They argue, this is the most promising course of action. This approach looks forward rather than back, and at the same time, builds on past achievements (Myers and Reid, op. cit.). In Zimbabwe, this would probably help to avoid confusion, duplication and wastage of effort and resources. Most likely, there would be a more convincing commitment to excellence in teacher education.

Also, from the Australian experience, one could learn something in this regard. In June of 1986, a national network was created including teachers, curriculum developers, as well as representatives from industry, commerce and the wider community (Journal of Curriculum Studies, 1988, Vol. 20, No. 6). The same year, a committee was established to look into the possibility of formal links between all those involved in curriculum development, teaching and industry.

13. At the moment, no formal links exist between teacher training institutions and industry. Lecturers at the university and at Belvedere made this clear.

According to Taylor (op. cit.), this conclusion could be regarded unfortunate since the framework within which teachers work is industrialization. He maintains that schools and colleges must necessarily adapt themselves to changing concepts of skill if they are to contribute to technological development. However, he also admits that the process of doing so is not easy. Probably, this explains why efforts being made at the university to establish such links have met with difficulties.

14. The workshop facilities used by the B.Ed. students are inadequate, considering the challenges awaiting them on completion of their course of studies. For example, it appears, the present level of machinery is only limiting them to those skills they already have from their initial teacher training. In other words, one does not get challenged or stretched far enough, in terms of creativity.

This conclusion is based on the responses of both students and lecturers in questionnaires and during interviews.

15. While teaching practice has proved a very important element in the teacher training program (s) at Belvedere, some students have not been able to teach their technical subjects. Both students and lecturers indicated that this was one of the most common problems encountered by students on teaching practice.

This conclusion is in line with similar findings relating to teaching practice. For example, Raths and Katz (op. cit.) assert that, despite the generally acknowledged central place of teaching practice in teacher education and the consistent research findings that students regard teaching practice as very important, it continues to present serious problems for program planners and remains for many students, a threatening, confusing, frustrating and disappointing experience.

For some students at Belvedere, particularly those lacking the necessary technical experience, this is unfortunate because by being confined to the teaching of their academic options, they lose those few practical skills they would have acquired in college. In fact, these are likely to be some of those who end up abandoning technical subjects to teach academic subjects on leaving college.

Perhaps, this could be part of the explanation as to why technical subjects are always worse off regarding manpower problems.

16. Given a chance and encouragement, most lecturers and students are in a position, and have the capacity to contribute towards the improvement of teacher training in Zimbabwe; particularly through research. This conclusion is in view of their suggestions and comments in the comments

section' of most questionnaires. Most, if not all, are quite aware of the strengths and weaknesses of the courses or programs they are involved in.

Teachers and lecturers are best situated to formulate and test curriculum research and development proposals (Journal of Curriculum Studies, *ibid.*). In this view, they become an integral part of the research process and provide the information needed for decision-making. Actually this view is based on the premise that, genuine improvement in educational practice depends upon broadening teachers' responsibilities for curriculum development and upon their capacity to analyse, reflect upon and modify their practice. Tickle argues that research-based teaching and teacher education gives due recognition to teachers' practical knowledge in teaching and learning to teach (Tickle, 1987). He also maintains that it helps clarify and reconcile the gap between research and practice in education.

For Tickle, research-based teacher education also demands a restructured partnership among prospective teachers, practising teachers and teacher educators. This view is opposed to traditional partnerships where the focus is on the limited independent roles of the various participants. Tickle's critique of traditional partnerships is that they do not sufficiently value or make appropriate use of teachers' practical knowledge. He holds, research-based teacher education within authentic partnerships does use and extend the lecturers' and/or teachers' practical knowledge.

Teacher educators above all, should have a healthy suspicion of the sloganeering that goes in the name of educational research (Education Researcher, 1988, Vol.17, No. 2). Hence, the advantage of having teacher educators involved in research is that they do not wait for researchers from elsewhere to tell them what to do. Instead, they can run applied research programs of their own.

17. Although it is claimed that graduates from the B.Ed. course are expected to handle 'A' Level classes in technical subjects, one still finds it something that needs to be proved. According to the syllabi, one of the overall aims is to prepare students for 'A' Level teaching, [See Appendices (xiii), (xiv) and (xv)]. This was confirmed by both students and lecturers. Students indicated in questionnaires that on completion of their course of studies they were expected to handle 'A' Level classes and even tertiary levels.

However, lecturers indicated that they knew virtually nothing about the 'A' Level syllabi designed for the teaching of technical subjects. That being the case, one is tempted to ask: How then, could they be sure of their students being able to handle that level?

One would probably be sure of how these graduates fare in their teaching at this level, perhaps after a close analysis of their performance in schools; hence, this conclusion.

18. While student teachers at Belvedere are expected to handle 'O' Level classes on completion of their course of studies, many are likely to experience difficulties, confronted with 'O' Level classes. This conclusion follows the observation that the majority of the students enrolling at Belvedere lack the necessary background experience in technical subjects. According to the lecturers interviewed, most of them spend a lot of time trying to help these students acquire some basic skills, most of which are only appropriate to Z.J.C. level; for example, testing for squareness. (see Picture Plate 6)

This conclusion also follows a few cases of third year students indicating that they encountered problems in some of their teaching involving 'O' Level classes during their second year T.P. Although these were very few cases (about 10% of the students), one would still find them significant under this conclusion. The situation could even be serious for those who apart from lacking the necessary background experience, also fail to secure places for teaching their technical subject areas.

19. So far, a lot has been done, both at Belvedere and at the university to gear the respective teacher training programs towards the current secondary school curricula. However, doing this has not been easy and many problems have been encountered in both institutions.

This conclusion is a direct answer to the first secondary research question where one tries to find out what measures have been taken by these institutions in this respect. Also answered, are those questions addressed to these institutions towards the end of the second chapter where one questioned the position of teacher education in Zimbabwe in a situation of rapid and continuous change.

20. The question of teacher training has taken a new dimension with the opening of pilot schools where the recent move to vocationalize the teaching of technical subjects at secondary school level (The 1987 Education Act) is being tried out.

Despite all the positive views held by both lecturers and students both at Belvedere and at the university regarding the respective programs, there is still one thing none of them could understand or explain. This was the fact that none of those completing in both institutions are qualified to teach in the newly established pilot schools.

At C.D.U. it was alleged that the graduates from both institutions lacked the necessary practical experience. It was also disclosed that at the moment, only First Grade Journeymen with an industrial background are qualified to teach in these schools. Teachers from Belvedere, with so little technical and practical experience, do not even qualify for 'trade testing'. As one C.D.U. officer pointed out; they can only qualify for 'trade testing' after the U.Z. B.Ed. course. This meant that those from the university can only teach in the pilot schools after undergoing Trade Testing. To a certain extent, it also meant that C.D.U., at least, recognized the practical experience of the B.Ed. graduates.

Having said that, one wonders how best this could be explained. Perhaps, the conclusion itself as given here could a good explanation; the 1987 Act has brought new dimension in the teaching of technical subjects in Zimbabwe.

Secondly, schools offering technical subjects can now be said to manifest in two patterns; those which have been offering technical subjects all along and those that have come with the new education act. Therefore, while the, old pattern will accommodate graduates from Belvedere and university, the new pattern demands its own caliber of teacher. In a way, this means that although those at Belvedere and university have so far tried to keep up with changes in technical education, they have not done so well enough to cater for the needs of the new pilot schools. Apparently, this has resulted in serious questions being raised by all those concerned; educators, policy makers and even students. Most of the questions raised relate to the issue of planning. However, such questions are beyond the scope of this study and call for separate studies!

This conclusion is closely related to findings of similar studies in Sierra Leone as already revealed by the review of literature. For example, Lauglo and Lillis (op. cit.), describe a situation where the whole of technical education became totally confused. In this case, while most of the pilot schools still operated mediocre versions of traditional craft-based syllabi in Woodwork and Metalwork, teacher education programs embarked on an innovative and integrated approach to technology known as 'Design and Technology'. This situation was actually difficult to understand. In most countries, the proposed curriculum is subject to experimental tests before it is adopted for use by teachers. Pilot schools are among the many ways to set up an evaluation program. That being the case, one would expect them to be more innovative than ordinary schools. In this case they were found to be less progressive than teachers' colleges and ordinary schools!

Whenever curriculum is adopted, there must be a way of putting it into effect. According to Hanson and Brembeck (op. cit.), this varies from the

one extreme of rapid regimentation (where teachers are expected to follow strictly the letter of the standard syllabus) to the opposite extreme of unrestricted freedom (where the teacher may or may not follow the syllabus and can do as s/he pleases). Actually, there has been no evidence of either extreme in Zimbabwe. There has been a tendency to prescribe the scope and content of the curriculum, but to leave it to the teacher to select methods and use the type of organization of material s/he thinks best fit for her or his class.

5.03 Recommendations and suggestions (Further research)

Most research studies can be characterised by what they fail to consider as well as by what they study. Here, many important questions have been neglected and others may want to explore. However, some observations have been made on the directions which such research might go. And, based upon the review of the literature, the methodology, the results and the conclusions presented in this study, the following recommendations and suggestions are offered to teacher educators, policy makers, Ministry of Education, Curriculum Development Unit and other interested parties:

1. This study should be replicated with either the same, or a similar population using the same instruments. It is suggested that, if possible, the number of lecturers be higher than the one used in this study, particularly at the university. It is also recommended that the institutions remain the same. However, a different group of experts should be asked to examine the instruments for validity and reliability.
2. Using a similar set of instruments, the study should be replicated with a different population in either the same, or similar institutions. It is recommended that a different panel of experts and subject specialists be used to test the instruments for validity and reliability.
3. Using a similar set of instruments, and a different panel of experts to test for validity and reliability, this study should be replicated with second and fourth year students at Belvedere. It is recommended that a larger group of group of lecturers be included from the University of Zimbabwe.
4. Research which focuses simultaneously on the training of both school teachers and lecturers is still needed. Such a study would probably shade light on the needs of both parties in terms of professional preparation.

Then, perhaps one might be able to suggest the kind of training that lecturers should also undergo in order to be more effective in their efforts to assist student teachers, depending on their individual or group needs as prospective professionals. Also, from this kind of study one might have an idea of the effect or impact of lecturer-performance on student teacher-performance.

5. Further research should also consider, not only the performance of lecturers, but the educational backgrounds of students. In such a study, one would perhaps need to find out how a student's educational background relates to the mechanisms operating at intake levels; particularly in pre-service programs. From there it would also be of importance to find out how one's performance at secondary school level relates to performance in college.

6. From the experience of most countries, it appears, there has been a lot of confusion regarding the duration of teacher training programs. For the past fifteen or so years, teacher training in Zimbabwe has been undergoing several adjustments in terms of duration. For example, there was a time when initial training was two years. From there, it became three years until 1982 when that year's intake pioneered a four year program. However, now they are talking of taking it back to three years starting, with the 1988 first year intake.

No particular study has looked into this issue adequately; so, there is a need for research. In such a study, one should perhaps find out what factors are or should be considered when deciding on the duration of particular programs.

There is a strong argument supporting long duration for pre-service courses in most countries; Finland, being a good example (OECD-Finland, op. cit). Given the Zimbabwean context, one would probably propose that a long duration of the courses at Belvedere should result in graduates leaving college with a first degree in education. With such an idea, one would probably be looking at the University of Zimbabwe moving from the B.Ed. to a masters' degree for technical-subject teachers. This would in fact mean that those completing at Belvedere would have a chance to advance into a masters' degree program, either straight or after a few years of service. The main advantage of such a move would be the fact that there would be maximum utilization of facilities in the sense that the university would remain picking from where Belvedere leaves, but this time at a higher level of manpower development. With this suggestion, it might also be recommended that it be started off as an experiment where a group of students enrolls at Belvedere with high entry qualifications; say, good 'A' Level passes.

After the first degree at Belvedere, one would need to follow the group into university for a masters' degree.

On the experiment being successful, the main advantage is likely to be the fact that, while raising standards, it will also attract candidates of a high caliber into the area of technical subjects. This would also mean an improvement in the status of technical subjects; particularly at the university where it is likely to remain low for a foreseeable future.

7. The B.Ed course for technical subject teachers has been running at the University of Zimbabwe since 1987 and so far no study has been done to look into the performance of the graduates after the course. Therefore, there is a great need for such a study.

In fact, the follow-up survey remains the dominant, and arguably the predominant, approach to teacher education program evaluation (Raths and Katz, *op. cit.*). To understand the impact of the university's B.Ed. courses on the performance of teachers, one probably needs to consider the possibility of follow-up studies where a particular group of teachers is studied at various stages, for example; before joining the program, in the program, after the program and back into schools or other institutions. Such a study will obviously need several years; say, five or so. Raths and Katz (*op. cit.*), cite a similar study involving pre-service programs at the Western Kentucky University, United States. In this case a group was studied from the time it joined college up to completion and right into schools, after graduation. The study took seven years, and was found very productive.

8. One of the most outstanding characteristics of teacher education program evaluation reports is their lack of analysis and discussion of the data and therefore lack of specific conclusions and recommendations for program modification. As noted by Raths and Katz (*op. cit.*), teacher education program evaluations are highly individualistic, institution-specific endeavours which are used primarily for internal purposes. Hence, studies are still needed where institutions; in this case, Belvedere and the university, would sought to design evaluation plans which do not only meet their individual needs but also contribute to a body of knowledge, for example; methodology, performance assessment and model building.

9. As already discussed, master teachers have been found to be very helpful to students on teaching practice. Unfortunately, not much is known as to how their assistance could be co-ordinated with that of college lecturers. Therefore, further research is still needed to find out how master teachers and college lecturers could work together for the benefit of student teachers. Such a study would be more helpful by

enabling one to identify those activities which should constitute a program aimed at preparing master teachers for their supervisory roles. This would be of great importance in a situation such as ours where there is very little literature, if any, relating to such preparations.

10. A study which focuses on the question of staffing in pilot schools is still needed.

Given two options; one, where teachers from Belvedere have to go through trade testing and the other, where journeymen from industry will need to go for in-service courses in education, one would perhaps need to make a careful choice. Therefore, such a study would be of great use to one trying to make a decision as to which teacher to choose. Most important, would probably be issues of cost. One would need to find out which would be cheaper, in terms of manpower and material resources; to raise the practical experience of teachers through trade testing, or to upgrade journeymen through in-service courses in education.

Whatever the choice, after upgrading courses, one's level of performance would still need to be determined through follow-up studies, from college into school.

5.04 End note

As pointed out in the review of literature, teachers have always filled the role of interpreters of curriculum; now a more comprehensive and challenging task is being thrust upon them. More than ever before, they are expected to understand and interpret more complicated phenomena within the context of education.

Therefore, it is thought appropriate here to propose that all those who are at the moment involved in teacher education, either as students or lecturers should take up the challenge of trying some of the studies recommended in this study. It is their duty and responsibility since they are the experts. And it is most unlikely that anyone from outside their profession will understand or solve their problems.

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APPENDICES

QUESTIONNAIRE (A)

NOTE: (i) To give your responses in the spaces provided between the brackets on some of the items, please do so by means of placing a tick in the spaces wherever appropriate. Where you might want to make any changes, after placing a tick, feel free to do so either by rubbing, or by changing the tick into a cross before placing the tick where you want it.

(ii) Where you might be required to give an explanation or suggestion under some of the items, please feel free to make use of the room (space) provided wherever appropriate.

(iii) In cases where you might need more information regarding any of the items below, please, feel free to ask.

1. Sex -----() male or () female.

2. Subject (s) or subject combination _____

3. (i) Did you study any Technical Subject(s) at secondary school level?

() Yes. () No.

(ii) If 'yes', please indicate which

() Woodwork. () Metalwork. () Building.

Any other (s), name it (them) _____

4. If you studied any Technical Subject (s) during your secondary education, up to what level was it? Please indicate:

() Form Two. () 'O' Level. () 'A' Level.

5. (i) Did you sit for any examination (s) in this (these) subject (s)?

() Yes. () No.

(ii) If 'yes', please indicate the level (s)

() Form Two () 'O' Level. () 'A' Level.

(iii) How did you perform?

Form Two

'O' Level

'A' Level

() Passed.

() Passed.

() Passed.

() Failed.

() Failed.

() Failed.

6. The fact that you joined this college and you are studying the subject (s) that you mentioned above, was it your choice or you were for one reason or another channelled into that area? Please explain.

7. So far, how would you rate the link between your major subject area (s) and your educational studies (e.g. Psychology, Sociology and Philosophy)? Please indicate.

- () Very close () Fairly close () very remote.
 () Difficult to tell.

8. Regarding the capacity of your college workshop (s) and the relevance of the course you are doing, which of the following statements could be true and which ones would you agree with?

NOTE : The SCALE is the same as in item No. 11 above.

	5	4	3	2	1
(i) Since I am going on teaching practice next year, I now feel fully prepared after my time in college this year.					
(ii) From my experience during secondary education and during my Observation Period, I find the tools and other equipment in the college workshop (s) adequate.					
(iii) Understanding the challenges awaiting me in schools after my training, the text-books I am using for this course are relevant and appropriate for my level.					
(iv) From my experience during my secondary education and/or during 'observation period,' the activities I am covering in college are quite relevant in terms of knowledge and skills. These include,					
(a) Practical project work,					

-3-

	5	4	3	2	1
8. (iv) cont.					
(b) Allied Theory,					
(c) Applied Education,					
(d) Theory Of Education,					
And (e) Peer-group teaching					

8. (v) Any other comments you might have on this item are welcome here.

9. How well informed are you about the current changes in the Zimbabwean educational system, particularly the move to vocationalize the teaching of Technical Subjects at secondary school level?

() very well informed. ---What do the changes involve?

() fairly informed. --- From what you know, what is actually involved?

() barely informed. --- What would you like to know?

10. Any other comments you might have concerning the whole questionnaire are welcome in the space below and over-leaf.

QUESTIONNAIRE (B)

NOTE : (i) To give your responses in the spaces provided between the brackets on some of the items, please do so by means of placing a tick in the spaces wherever appropriate. Where you might want to make any changes, after placing a tick, feel free to do so by rubbing, or by changing the tick into a cross before placing the tick where you want it.

(ii) Where you might be required to give an explanation or suggestion under some of the items, please, feel free to make use of the room (space) provided wherever appropriate.

(iii) In cases where you might need more information regarding of the items below, please, feel free to ask

1. Sex --- () Male () Female.

2. Subject (s) or subject combination. _____

3. Where did you do your last teaching practice (district or region) ? _____

4. What level (s), or class (es) were you working with (e.g. Form One or O' Level) ? _____

5. Were you prepared to teach at that level or those levels ?

() Yes () No.

6(a) If the following statements were said to be yours regarding your experience during the last teaching practice, your experiences in this program and views about your course, which ones would you agree with ?

NOTE The SCALE of your responses is as follows;

- 5 = Strongly agree
4 = Agree
3 = Not sure
2 = Disagree
1 = Strongly disagree

	5	4	3	2	1
(i) Before I left college for teaching practice last year, I was very well informed about the situation in secondary schools regarding curricula and syllabi					

6. cont.	5	4	3	2	1
(ii) The following elements in my course of studies are very important for my professional development as a technical subject teacher.					
(a) Practical project work					
(b) Allied theory					
(c) Applied Education					
(d) Theory of Education					
(e) Peer group teaching					
(f) Audio Visual Aids					
(iii) During teaching practice last year, I did not have any problems with the following.					
(a) understanding the school organization,					
(b) school administration,					
(c) working with school staff (including the headmaster).					
(d) working with and understanding pupils;					
(e) new tools, new machines and other new equipment ('NEW'-meaning what you had never used before).					
(iv) Teaching Practice is a important element of my course.					
(v) Considering the amount of work that I had to cover during last teaching practice, the time that I had was quite enough					
(vi) Most of the work that I had covered in college before going out was very relevant and useful during my teaching practice					

6. cont.

	5	4	3	2	1
(vii) I was very pleased with the way that I was assessed during teaching practice.					
(viii) Compared to the workshop(s) that I was using during teaching practice, the capacity of the college workshop (s) is quite satisfactory, in terms of facilities.					
(ix) Now that I am almost on my way to another period of teaching practice, I feel fully prepared after the work covered in college during the course of this year.					

6 (b) Any other views that you might have under this item are welcome in the space below and/or at the back of the questionnaire

7. Apart from your everyday duties as a teacher expected to conduct teaching in your subject area, what other duties or roles did you find yourself being expected to fulfil during your teaching practice? And, had you anticipated such possibilities? _____

8. Given a chance, would you prefer going back to the school where you were last year?

() Yes () No

In either case, why? However, reasons which might be strictly personal may be left out! _____

9. Which aspects of your course do you think are important or relevant for your professional development and why?

10. Which aspects of your course do you feel are irrelevant and why ?

11. In your major subject area, regarding the requirements of curricula at secondary school level:

(i) which topics do you feel are most important or relevant and why?

(ii) which topics do you feel are irrelevant and why ?

12. Comments and any other views that you might have concerning the whole questionnaire are welcome in the space below and over-leaf.

-1-

QUESTIONNAIRE (C)

NOTE. (i) To give your responses in the spaces provided between the brackets on some of the items, please do so by placing a tick in the spaces wherever appropriate. Where you might want to make any changes after placing a tick, feel free to do so either by rubbing or by changing the tick into a cross before placing the tick where you want it.

(ii) Where you might be required to give an explanation or suggestions under some of the items, please, feel free to make use of the room (space) provided wherever appropriate.

(iii) In cases where you might need more information regarding any of the items below, please, feel free to ask.

1. (a) Subject area (s) _____
 (b) May you please give a brief account of your professional background here? _____

2. How long have you been working in this college? _____

3. If the following statements were taken to be yours, which ones would you agree with? Indicate the degree to which you would agree or disagree by placing ticks in appropriate columns.

NOTE. The SCALE of your responses is as follows,

- 5 = strongly agree
 4 = agree
 3 = not sure
 2 = disagree
 1 = strongly disagree

	5	4	3	2	1
(i) I am quite well informed about the current changes within the Zimbabwean Educational system; particularly the recent move to vocationalize the teaching of Technical Subjects at secondary school level.					
(ii) The move to vocationalize Technical Subjects is already having an impact on the teacher training program (s) in this college.					

3. cont.

	5	4	3	2	1
(iii) I am very well informed about the following syllabi as followed in secondary schools in the teaching of Technical Subjects, particularly my subject area.					
(a) Z.J.C. (Zimbabwe Junior Certificate)					
(b) 'O' Level					
(c) 'A' Level					
(iv) Referring to my subject area, I find the content in college similar to that in most schools, in terms of knowledge and skills.					
(v) In my opinion, this college has the capacity to handle up-grading (in-service) courses for Technical Subject teachers.					

NOTE: Any other views that you might have under this item are welcome in the space below.

4 At the moment, are you in this college, running any form of upgrading course (s) for Technical Subject teachers ?

() Yes () No

(ii) If 'yes', please specify the type and/or nature of the course (s) :

5 Have you ever worked with student-teachers on teaching practice?

() Yes () No

5. Concerning teaching practice and other related issues in teacher training, which of the following statements would you agree with ?

NOTE The SCALE of your responses is as follows ;

- 5 = Totally agree.
 4 = Agree.
 3 = Not sure.
 2 = Disagree
 1 = Totally disagree.

	5	4	3	2	1
(i) Generally, teaching practice is a very necessary and important component of teacher training.					
(ii) The time allocated for this exercise in this college is adequate.					
(iii) Most of the work covered in college before students go out on teaching practice is quite relevant and important during their time in schools.					
(iv) In most cases the teachers in schools have been very helpful to students on teaching practice by way of supervision and advice.					
(v) Compared to the capacity of an average school workshop, that of the college workshop (s) is quite adequate, in terms of equipment and other facilities.					
(vi) It is important to establish links between some of the activities in this college and those of the Curriculum Development Unit with particular reference to Technical Subjects.					
(vii) Some of the activities in this college are closely related to those at the University Of Zimbabwe (BEd. Technical Subjects), regarding the area of teacher training.					

7. From your experience as a teacher-educator/trainer, what preparations do you think are necessary and what knowledge and skills would you say student teachers should acquire before going out on teaching practice?

8. Any other comments or views that you have regarding any of the above issues are welcome in the space below and over-leaf.

QUESTIONNAIRE (D)

NOTE : (i) To give your responses in the spaces provided between the brackets on some of the items, please do so by means of placing a tick in the spaces wherever appropriate. Where you might want to make any changes after placing a tick, feel free to do so by rubbing or by changing the tick into a cross before placing the tick where you want it.

(ii) Where you might be required to give an explanation or suggestions under some of the items, please, feel free to make use of the room (space) provided wherever appropriate.

(iii) In cases where you might need more information regarding any of the items below, Please, feel free to ask.

1. (a) Main subject area (s) _____

(b) What other subjects are you studying apart from your major subject(s)? Please list in order of importance starting with what you think is most important in terms of knowledge and skills.

2. What subject (s) were you teaching before joining this program ?

3. What level (s) or age group (s) were you working with before joining this program? _____

4. To which college did you go for your initial teacher training, if you trained as a teacher? When? _____

5. What was or were your major subject area (s) during your initial teacher training? _____

6. How long did you have to wait before joining this program ?

7.(i) Within your major subject area, which aspects or topics are you expected to cover? Please list in order of importance starting with the most important.

7.(ii) Which aspects or topics in your subject area do you feel should have been included in this program although they have been left out? Why?

8. Apart from your everyday duties as a class teacher in the classroom or in the workshop, what other duties or roles were you expected to fulfil in your school before joining this program? List a few examples please.

9. If the following statements were said to be yours, which ones would you agree with? Please, indicate the degree to which you would agree or disagree by placing ticks in appropriate columns.

NOTE: The SCALE for your reactions is as follows,

- 5 = Strongly agree.
 4 = Agree.
 3 = Not sure.
 2 = Disagree.
 1 = Strongly disagree.

	5	4	3	2	1
(i) My initial teacher training was very relevant to my professional development as a technical subject teacher.					
(ii) In view of the professional challenges awaiting me on completion of this course, the work we are covering in this program is very relevant and appropriate.					
(a) Prerequisite courses					
(b) Content Courses					
(c) Curriculum Courses					
(d) Teaching methods					
(e) Study Visits					
(iii) Considering the capacity of an average school workshop and the challenges that I am going to meet after my training in this program, the workshop (s) we are using is/are adequately equipped in terms of tools, machines and other workshop facilities.					
(iv) Considering the amount of work we have to cover, the time we spent on this course is quite sufficient.					

9 cont.

5

4

3

2

1

(v) Project Work (Extended or Depth - Study) is a very important element of this course.

(vi) This course is quite in agreement with my expectations, in terms of knowledge and skills

9.(vii) Any other views you might have on this item are welcome in the space below and/or over-leaf.

10. How well informed are you about the current changes in the Zimbabwean Educational system; particularly the move to vocationalize the teaching of Technical Subjects at secondary school level? Please indicate.

() very well informed. () fairly informed. () barely informed.

(ii) If at all informed; what would you say the move actually involves?

(iii) If not informed, what is it that you feel you would like to know?

11. Any other views that you might have concerning the whole questionnaire are welcome in the space below and/or over-leaf.

QUESTIONNAIRE (E)

NOTE - (i) To give your responses in the spaces provided between the brackets on some of the items, please do so by means of placing a tick in the spaces wherever appropriate. Where you might want to make any changes after placing a tick, feel free to do so by rubbing or by changing the tick into a cross before placing the tick where you want it.

(ii) Where you might be required to give an explanation or suggestions under some of the items, please, feel free to make use of the room (space) provided wherever appropriate.

(iii) In cases where you might need more information regarding any of the items below, please, feel free to ask

1. Subject (s) _____

(b) May you please say anything that you might feel like saying about your professional background? Perhaps, also including your experience with serving-teachers on similar up-grading courses. (similar to what you have in this program)

2. If the following statements were said to be yours, concerning your knowledge of the Zimbabwean Educational system, which of them would you agree with?

NOTE The SCALE of your responses is as follows;

- 5 = Absolutely agree
 4 = Agree
 3 = Not sure
 2 = Disagree
 1 = Absolutely Disagree

	5	4	3	2	1
(i) I am very well informed about the Zimbabwean Educational system; particularly the move to vocationalize the teaching of Technical Subjects at secondary school level.					

2. cont.

	5	4	3	2	1
(ii) The current changes in the educational system regarding the teaching of Technical subjects in secondary schools have already started having an impact on this teacher training program in respect of subject content.					
(iii) I am quite familiar with the syllabi being followed in the teaching of Tech. Subjects at the following levels.					
(a) Z.J.C. (Zimbabwe Junior Certificate).					
(b) 'O' Level					
(c) 'A' Level					
(iv) In view of the syllabi and other activities covered in the teaching of Tech. Subjects in secondary schools, the activities in this teacher training program are quite relevant in terms of knowledge and skills.					
(v) Considering the amount of work that we have to cover with particular groups in this program, the amount of time we spent is quite enough.					
(vi) The Depth Studies (Project Work) done by students are very important in terms of knowledge building in the Zimbabwean Educational system particularly for the development of Technical Subjects.					
(vii) Regarding the up-grading of teachers in schools through this program, the capacity of this institution, in terms of manpower and facilities, is quite adequate.					
(viii) Considering the capacity of an average school workshop, in terms of facilities (tools, machines and other equipment); that of this institution is quite adequate					

() Yes. () No.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page or a sheet of stationery. There is no handwriting or other markings on the page.

INTERVIEW (A)

1. Sex _____

2. Subj. (s) or subj. combination _____

3. Compared to an average sch. workshop, how would you comment on the capacity of your college workshop (s) in terms of facilities? _____

4. Since you are going on teaching practice next year, how well prepared do feel after your time in college this year? _____

5. Which elements of your course do think are most important and why? _____

6. Which elements of your course do you think are irrelevant and why? _____

7. What would you say is involved in the new move to vocationalize the teaching of tech. subjects at secondary level? _____

INTERVIEW (B)

1. Subject (s) or subj. combination _____
2. Where did you do your teaching practice? _____
3. How informed were you about the situation in schs. in terms of curricula and syllabi before you left college? _____?
4. During your teaching practice did you face any particular problems? If you did, what were they and what did you do about them?

5. How do you value teaching practice as an element of your course?

6. Considering the amount of work you were expected to cover, do you think you had enough time? If not, what would you suggest?

7. From your experience during teaching practice how would you comment on the capacity of your college workshop(s) in terms of facilities?

8. Since you will be on teaching practice again next year, how well prepared do you feel after your time in college this year?

9. Given a chance, would you chose to go to the same sch. where you were last year? In either case why? _____
10. Which aspects of your course do you think are most important or relevant and why? _____

11. Which aspects of your course do feel are irrelevant and why?

12. In your subject area which topics do you think are important or relevant and why? _____

13. In your subj. area which topics do you feel are irrelevant and why?

14. How well informed are you about the changes in the Zimbabwean Ed system, particularly the vocationalization of Tech. Subjs. at sec. sch level.

INTERVIEW (C)

1. Subject (s) _____
2. How well familiar are you with the recent move to vocationalize the teaching of tech. subs? What is actually involved?

3. Could one say this move has already had an impact on your program (s)? If 'yes', in what ways?

(ii) If 'not yet'; what could one anticipate?

4. What links exist between some of your activities in this institution and those of the University of Zimbabwe (BEd Tech. Subs.)?

5. What links exist between this institution and the Curriculum Development Unit?

6. How much supervision do students get while on teaching practice?

7. Where students have had problems while on practice, what problems have been found to be most common and what solutions have been tried?

8. What kind of project work are students engaged in during skill training?

(ii) And, in what ways does this help students develop those skills which they find useful in their teaching?

9. Any other issues

INTERVIEW (D)

1. Subject area (s) : _____
2. Other subjects apart from your major subject (s):

3. When and where did you train for initial teacher training ? _____
4. What subject (s) did you study during your initial teacher training ?

5. What subjects were you teaching in your last school?

6. Apart from teaching , what other duties and roles were you expected to perform in your last school ? _____

7. If it was your own choice to join this program, what was the motive behind ?

- (ii) If it was not your choice, who asked you to or what forced you to do so and why ? _____

8. Up to what level are you going to teach after this course ? _____
9. Within your subject area which topics do think are most important or relevant for your professional development and why ? _____

10. In your subject area, which aspects would you say are irrelevant and why ?

11. What do you think about the duration of this course ? Is the time you spend enough? _____
- (ii) If insufficient what would you suggest ? _____
12. Would you say the recent move to vocationalize tech. subjs. has already had an impact on the nature of your course ? In what way (s)?

13. From what you know, what does the move actually involve ?

INTERVIEW (E)

1. Subject (s) :- _____
2. From what you know, what does the current move to vocationalize the teaching of tech. subs. involve? _____

(ii) In what ways could this be said to be having an influence on your teacher training programs? _____

3. What approach do you use in skill training (traditional or any other)?
And, what is the advantage of that approach? _____

4. Considering the level you are working with, how would you comment on the relevance of the kind of literature you are using with students? _____

5. What links have existed between some of your activities are those of the Curriculum Development Unit? _____

6. What links have existed between some of your activities and those of Belvedere Trs. College? _____

7. What do you think about the duration of this course considering the amount of work to be covered? _____

8. What kind of background should students have in order to qualify joining this program? _____

9. How do students decide on what topics to write about in Project Work or Extended Studies? _____

(ii) In what way (s) is this work be useful to the student? _____

INTERVIEW (F)

1. How well familiar are you with the current move to vocationalize the teaching of tech. subjects at sec. sch. level? What does this actually involve in the context of Zimbabwe?

2. Would you say this move has already started having an impact on programs in the following institutions? In what ways?

(a) Sec. Schs. _____

(b) Belvedere Trs.' College _____

(c) The University of Zimbabwe (BEd. Tech. Subjects) _____

3. What links exist between your department and schs., in terms of activities?

4. What links exist between your department and Belvedere Trs.' College, in terms of activities?

5. What links exist between your department and the University of Zimbabwe, in terms of activities?

6. From a curriculum point of view, how would you express the need to up-grade the teachers in schools?

7. So far, what steps have been taken to upgrade tech. subj. trs.?

8. Faced with high demand to enrol for upgrading courses, how are responsible institutions managing?

9. How would you comment the provision of relevant literature in schools where the curriculum is continuously changing?

Inventory of tools and other equipment.

B.T.C. METALWORK DEPARTMENT _ (1988).

WORKSHOP NO. 1		WORKSHOP NO. 2	
ITEM	QUANTITY	ITEM	QUANTITY
Angle grinder	2	Sand bags	18
Large anvils	12	Soldering bit (hatchet-690)	12
Small anvil	8	" " (hatchet-460)	11
Anvil stands	3	" " (straight-690)	18
Leather aprons	16	" " (hatchet-230)	1
Bench drilling machine	1	" " (straight-460)	17
Bench vices	16	" " (straight-230)	16
Blow lamps	9	" " (straight-920)	1
Chipping hammers	10	Spot welder	1
Dake arbor press	1	Bottom stakes	2
Disc cutting machine	1	Canister stakes	19
Flatters	14	Funnel stakes	7
Flint lighters	10	Stakes (doomed)	10
Fullers	8	Half-moon stakes	4
Furnaces	1	Hatchet stakes	1
G-Clamp	8	Taper-head stakes	17
Gas kits	6	Raised stakes	12
Gas welding regulators	10	Squared stakes	3
Leather gloves	20	Straight edge (rule)	10
Goggles	10	Beam set	6
Hand forges	15	Tinman's anvil	4
47kg. gas cylinders	4	Tinman's horse	10
20kg. gas cylinders	2	Straight tinsnips	3
Hardies	3	Curved tinsnips	3
Hot sets	28	Universal tinsnips	8
Hydraulic pipe bender	1	Vices	33
Knee caps	20	Wheel grinders	1
Leg vices	11	Benches	14
Mixers	10	Bench shears	1
Nozzles (size 5)	10	Black iron	1
" (size 10)	10	Buffing machine	2
Acetylene cylinders	8	Creasting iron	5
Oxygen cylinders	8	Crucibles	20
Pipe vice	1	" Holder	1
Sash clamp	4	Drilling machine	5
Sledge hammer (large)	4	Flasks	3
" (small)	4	Folding bars	9
Soldering stoves	3	Gillotine (sheetmetal)	2
Spindle keys	10	Grooved seam	10
Swages (top & bottom)	3	Folding machine	2
Brass tongs	2	Tucking hammer	17
Tongs (hollow bit)	3	Straight pein hammer	3
Tongs (open mouth)	3	Hollowing hammer	3
Welding benches	10	Bullet hammer	3
Welding clamps	6	Blocking hammer	23
Weld-out sets	7	Jenny edging machine	2
Welding machine	12	Centre lathe	2
Welding shields/helmets	22	Wooden mallet	30
Wheel grinders	1	Rawhide mallet	44
Wire brushes	20	Planishing hammer	33
Work benches (small)	3	Power saw	1
" " (large)	4	Punching machine	2
		" kits	2
		Rammers	5
		Rivet snap	114
		Rollers	2

B.T.C. METALWORK DEPARTMENT (1988).

ITEM	QUANTITY
Ball pein hammers	12
Benchers	13
Builder's square	4
Inside calipers	46
Odd-leg calipers	24
Outside calipers	46
Cross-cut chisel	8
Diamond chisel	11
20mm flat cold chisel	8
25mm flat cold chisel	4
15mm flat cold chisel	5
Combination set	10
Compressor	3
Copper mallet	1
Rawhide mallet	1
Toolmaker's clamp	39
Hand drill	11
Pillar drill	5
Portable drill hammer	2
Portable drill (reverse)	1
Extension code	2
Hand vices (small)	4
Hand vices (large)	4
Hydraulic jack	1
Adjustable depth gauge	9
Fixed depth gauge	4
Machine bender (universal)	1
Material tester	1
1m steel rule	5
Rule & gauge	2
Pipe cutter	1
Pliers circlip	4
Fencing pliers	1
Flat-nosed pliers	1
Round-nosed pliers	1
Tong-pop riveter	1
Pliers-pop riveter	2
Puncher	2
Saw sheet	2
Sawing jig	1
Tenon saw	1
Screw driver	21
Crappers	2
Self-grip wrench	3
Open-end spanners (set)	1
Socket spanners (set)	1
Spray gun	1
Figure stamps (set)	3
Letter stamps (set)	6
12" Stilson wrench	1
14" Stilson wrench	1
18" Stilson wrench	2
242 Stilson wrench	1
2-6mm stock & dies	10
Warrior stock & dies	1
6-25mm Stock & dies	11
Wheel dresser	2
wire gauge	11

ITEM	QUANTITY
Allen key set	1
Benchers	2
Pillar drill	3
Radial drill	1
Drill set	1
23.81-26.98 Reamers	5
26.98-30.16 "	5
30.16-34.13 "	5
34.13-38.10 "	5
Greasing gun	1
Grinding machine	1
Tool post	2
Centre lathe	8
Catch plates (cranked dog)	8
" " (straight dog)	8
Dead centre	16
Live centre	8
Chuck - drilling	8
" - four jaw	8
" - three jaw	8
1/2" cranked dog	8
3/4" cranked dog	8
1" cranked dog	8
1/2" straight dog	8
3/4" straight dog	8
1" straight dog	8
8mm set allen keys	8
Morse-taper sleeves	8
Oiling pump	8
Carriage socket spanners	8
Chuck spanners (large)	16
" " (small)	16
Head stock gear	8
Parting off tool	8
Open-end ring spanner (12-13)	8
" " " (14-15)	8
" " " (18-17)	8
Fixed steady	8
Travelling steady	8
Maintenance lathe	2
Mallets	5
Inside micrometer	5
Outside micrometer	12
Milling machines	6
3/8 adapters	5
1/2 adapters	5
5/8 "	5
3/4 "	5
Draw bars	10
Vice wrenches	5
Power saw	1
Cranks	5
Shaping machines	2

B.T.C. WOODWORK DEPARTMENT - (1988)

ALL WORKSHOPS

ITEM	QUANTITY
Adze	1
Centre bit (set)	4
Counter sink bit	2
Screw driver	1
Ratchet brace	9
Cabinet scraper	19
3mm bevel edge chisel	12
10mm bevel edge chisel	7
18mm bevel edge chisel	26
25mm bevel edge chisel	94
10mm inside-ground gauge	7
16mm inside-ground gauge	3
25mm " "	1
10mm outside-ground gauge	4
16mm " "	3
6mm Registered mortice chisel	63
16mm " "	30
25mm " "	4
10mm bench firmer chisel	12
18mm " "	13
150mm G-clamp	12
900mm Sash clamp	24
Wing compass	6
Cutting gauge	4
Marking gauge	73
Glue pot	3
Upholstery hammer	13
Hand drill	2
Hand electric drill	4
Letter stamp (set)	7
Wood turning lathe	3
Planer	1
Circular saw	2
Radial saw	1
Woodworker's mallet	80
Nail punch	15
Oil stone	9
Pliers	6
Plough/grooving plane	4
Router plane	2
Smoothing plane	21
Pliers	1
Dovetail saw	3
Coping saw	39
Hack saw frame	5
Rip saw	11
Saw set	4
Engineer screw driver	5
Spirit level	1
Round faced spokeshave	20
Builder's square	4
1m rule	4
Woodworker's vice	4
Saw vice	1
Try square	30

ITEM	QUANTITY
Work benches	73
Expansive bit (set)	1
Forster bit (set)	2
Twist drill (set)	4
Bradawls	18
Extension cable	1
6mm bevel edge chisel	87
12mm bevel edge chisel	88
22mm bevel edge chisel	1
6mm inside-ground gauge	7
12mm " "	5
18mm inside-ground gauge	6
6mm outside-ground gauge	6
12mm " "	2
25mm " "	3
10mm registered mortice chisel	44
12mm " "	20
6mm bench firmer chisel	27
12mm " "	7
Wood-carving set	5
200mm G-clamp	21
1 250mm sash clamp	21
Folding rule (1m)	5
Mortice gauge	89
Gimlet	3
Claw hammer	3
Warrington hammer	12
Breast drill	10
Bench hold fast	1
Grinding machine	4
Pedestal drill	2
Band saw	2
Saw & planer	1
Thicknesser	1
Marking knife	74
Oil can	4
Orbital sander	1
Jack plane	103
Rebate plane	12
Shoulder plane	5
Jointer plane	4
Baw saw	4
Compass saw	5
Cross-cut saw	7
Panel saw	12
Tenon saw	102
Cabinet screw driver	15
Shding bevel	32
Flat-faced spokeshave	18
Combination square	3
300mm steel rule	63
3m -Tape measure	1
Engineer's vice	4
Rasp	4

P.T.C. BUILDING DEPARTMENT (1988)

TOOLS AND OTHER EQUIPMENT

ITEM	QUANTITY
Adjustable steel props	1
7mm auger bit	2
19 mm auger	2
Axe	2
Wheel barrow	38
Blow lamp	1
90mm plumb	2
Brick bolster	45
Block wire brush	10
19mm paint brush	2
35mm " "	2
75mm " "	2
150mm " "	1
Buckets	56
2 door steel cabinet	2
6mm wood chisel	14
10mm wood chisel	17
13mm " "	16
26mm " "	2
20x250mm cold chisel	2
25x300mm " "	7
200mm G-clamp	20
300mm sash clamp	20
1075mm sash clamp	10
1690mm sash clamp	12
External corner tool	10
Glass cutter	2
Drawing desk	3
Breast drill	1
Spade handle drill	1
Hand drill	5
6x75mm masonry drill	3
13x150mm masonry drill	1
Single cut flat file	1
Steel brick foam	1
Steel slab form	1
Portable disc grinder	1
Brick hammer	36
2kg club hammer	40
250mm Aluminium plasterers	30
Hoes (Diggers)	3
Jointer round brick bed)	33
Cross square jointer	2
Lapper	3
Line level	2
610mm spirit level	1
1200mm spirit level	118
Wooden mallets	24
1 tufflocks	11
Bricklayer's line	10
Electric plane	2
Jack plane	57
Rebate plane	8
Engineers' pliers	2
Overhead projector	1

ITEM	QUANTITY
6mm auger bit	2
10 mm	2
12.5mm auger bit	2
Claw bar	1
Sliding bevel	6
Boaster	10
100mm plumb	2
Block brush	56
13mm paint brush	3
25mm " "	5
50mm " "	8
102mm " "	2
175mm " "	2
4 drawer steel cabinet	5
Oil can	1
8mm wood chisel	7
12mm " "	2
18mm " "	3
15x175mm cold chisel	2
25x260mm cold chisel	24
150mm G-clamp	34
250mm G-clamp	20
900mm G-clamp	4
1375mm sash clamp	10
1600mm sash clamp	12
Internal corner tool	8
Steel pipe cutter	2
Drawing stool	2
Electric hammer drill	1
Two-speed electric drill	1
High speed drills (set)	2
10x100mm masonry drill	1
13x300mm masonry drill	1
Wooden float	29
Steel curb stone form	1
Marking gauge	21
Ball pein hammer	3
Claw hammer	9
Hammer comb	2
300mm aluminium plasterer	11
20mm plastic hose	2
Square brick jointer	2
Fixed jointer	5
Drum	2
450mm line level	1
915mm spirit level	70
2000mm spirit level	2
Concrete mixer	1
Picks	40
Jointer plane	1
Thicknesser mod. R.C. 33	1
" " R.C. 63	1
Smoothing plane	68
Fencing pliers	1
Rake	10

B.T.C. BUILDING DEPARTMENT - (1988)

TOOLS AND OTHER EQUIPMENT

<u>ITEM</u>	<u>QUANTITY</u>	<u>ITEM</u>	<u>QUANTITY</u>
Hand hammers	6	Medium cut rasp	2
Reeders	4	Boning rods	9
Ranging rods	6	Rollers	8
1m folding rule	3	Belt sander	1
Orbital sander	1	Coping saw	4
Cross cut saw	7	Back saw frame	7
abrasive cut off saw	2	Rip saw	23
Sheet saw	1	Tenon saw	75
Arbor bench saw mod.10	1	45mm paint scraper	60
50mm paint scraper	8	Sand screen	1
Cabinet screw driver	3	6x100mm screw driver	4
5x125mm screw driver	2	6x150mm screw driver	4
10x200mm screw driver	8	8x250mm screw driver	4
10x250mm "	4	10x300mm "	4
Philips screw driver	12	Skirting tool	2
250mm snips	1	310mm snips	2
Electric soldering gun	1	Straight soldering iron	1
Spades	36	200mm adjustable spanner	1
255mm adjustable spanners	1	300mm adjustable spanners	1
Flat spokeshave	3	Round spokeshave	3
Builders' square	171	Try squares	26
Jill stones	4	10m tape measure	1
30m tape measure	8	3.5m folding rule	145
Painter's tray	4	Trestles	4
Pumpy level stand	2	250mm trowel	77
280mm trowels	112	Gauge trowel	20
Plastering trowel	21	Painting trowels	61
Arc welding machine	1	Work benches	41
254mm stilson wrench	4	C.W. 15 wrench	1

U.Z. - BEd Metalwork Syllabus - 1988

UNIVERSITY OF KUALA LUMPUR
Department of Curriculum Studies

METALWORK SYLLABUS FOR 1988

Metal Craft I - 80 periods

Aims

The general aim of this course is to still upgrade the students to an A - teaching level. Other aims are to give the students opportunities to try different projects designs and ideas to fit into the higher levels of teaching.

It will also give the students ideas of how to organize metalwork fabrication at the minimum level of equipment and material needed to achieve the aim of the secondary school syllabi.

Objectives

The main objectives of this course are as follows:

- To give the students a higher skill in the area of metalwork and woodwork.
- To upgrade the skill of planning and completion of projects at a higher level of quality.
- To give the students project ideas for individual design development and completion adapted to a higher level of teaching at secondary schools.
- To encourage the students to liberate with different materials as a combination in project work.
- To teach the students the importance of correct applied surface treatment methods under different conditions.

Approach

This is a practical course and as such it will be carried out in a workshop. The content will be integrated in the Metal Technology and Drawing and Design course.

The coursework will be by compulsory assigned projects, individually. A minor part of the course will offer similar group assignments. Some projects will be adapted to fit suitable teaching projects at A-level in the secondary school system. It will also give the students opportunities to make their own designs within the limits of the assignments given to them. There will also be sessions with pure skill upgrading content that the students must pass during the course.

Content

- Establish operation lists for project fabrication.
- Cost analysis on project fabrications.
- **Hand processes:** (in different common metals)
Correct use of all common hand-measuring and marking out tools specified on the workshop equipment specification related to metal design and fabrication according to tolerance and other project specifications.
- **Machine processes:**
Correct use of all common metal processing machines specified on the workshop machine specification according to tolerance and other relevant project specifications.
- **Joining processes:** (in similar and different types of metals)
Correct use of the most common methods to join metals with similar and different characteristics according to standards and specifications.
- **Surface treatment methods:**
Correct use of different surface treatment methods for metals.
Methods in combination of different types of material.
Maintenance of machines and equipment according to specifications.

Assessment

This course will be examined equivalent.

The assessments will be done through two major course assignments and a number of minor course assignments throughout the course.

Course Value 10 %

UNIVERSITY OF KUALA LUMPUR
Department of Curriculum Studies

METALWORK AND WOODWORK SYLLABUS FOR 1988

Workshop Organization - 80 periods

Aims

The general aim is to develop an appreciation and understanding of the importance to organize a workshop in order to create an efficient learning situation for A-level teaching.

The course also aims to teach the B.Ed. students the necessary links between the preparation and planning aspects on one hand and effective and motivating teaching aspects on the other hand.

Objectives

The main objectives of the course are as follows:

- To give the students practical knowledge of the proper way to set up a teaching workshop.
- To teach the students to look critically upon existing conditions in order to achieve continuous improvements in their area of assignments.
- To make the students aware of safety facilities and regulations in order to work safely with secondary school pupils.
- To teach the students how to fabricate facilities to make the workshop teaching effective and motivating for students and more economic for society.
- To teach the students different types of teaching systems in the workshop in order to meet different types of teaching demands.

Approach

This is a practical course and as such it will be carried out in a workshop. The content will be integrated in the Teaching Methods course and the Drawing and Design course.

The coursework will be by compulsory assigned projects individually and in smaller groups. The projects will be related to workshop organizations - which means as well planning as pure workshop fabrication assignments.

Study visits to other educational institutions and industries will also be an essential part of the course to give ideas for the regular course work. Study visits will also be part of other courses in the B.Ed. programme and

will be co-ordinated for the most efficient outcome.

Content

- Evaluation and constructive criticism of existing facilities in the workshop and the environment.
- Organization of safety equipment and sign boards in the workshop.
- Material storing and transportation facilities in the workshop.
- Waste material storing.
- Tool keeping and storing facilities.
- Workshop layout in different aspects and on different levels of learning activities.
- Organizing a workshop study unit for A - level teaching.
- Teachers' responsibilities: responsibilities of other personnel of the Department.

Assessment

This course will be examined equivalent.

The assessments will be through one major group assignment throughout the course and a number of individual course assignments.

Course Value 10 %

UNIVERSITY OF ZIMBABWE
Department of Curriculum Studies

B.ED. TECHNICAL SUBJECTS - WOODWORK AND METALWORK SYLLABUS 1988

Teaching Methods 60 contact hours.

PREAMBLE

This is the Teacher Methodology course in the B.Ed. programme. The course will give teachers that have already completed a Teacher Training programme a higher competence in the professional area. After completion of this course, the students are qualified to take up further professional studies in corresponding areas at the B.Ed. level.

AIM

The aim of the Methodology course is to give a wider understanding of the complexity of different factors interfering the classroom situation. It is also to give teacher's competence to implement a more scientific approach to the Teaching Skills. Another aim is to encourage teachers to take up research studies in areas of specialization.

OBJECTIVES

- The course will give the students:
- A historical reference to teaching situations and dynamics in developing societies.
 - A reference of different philosophic ideologies and ideas influencing the classroom situations.
 - Knowledge of different types of educational systems.
 - Fundamentals of research methodology.
 - Further competence in teaching and learning materials development.
 - Further competence in teaching strategies and how to manage different classroom situations.
 - Fundamentals of social psychology and sociology.
 - Knowledge of student counselling and guidance.
 - Knowledge of curriculum issues related to subject areas.

APPROACH

The approach will be by lectures and assignments. The content will also be related to specialized subject areas.

- 2 -

CONTENT

- Library science.
- Historical background to Education and what influences development have in the classroom situations.
- Different philosophic ideologies, ideas and its power on academic and practical teaching subjects.
- Conflicts between academic and practical subjects in school systems and society.
- Outside factors influencing classroom activities.
- Centralized and decentralized education systems and its effect upon the teaching conditions and learning situations.
- Research methodology; Statistics; Questionnaires; Interviews, report writing.
- Classroom relations; Fundamentals of social psychology, fundamentals of sociology.
- Techniques of questioning.
- Evaluation and assessment.
- Teaching and learning material development.
- Teaching strategies.
- Curriculum issues in subject related areas; planning development; effects.
- Curriculum revision - effects.
- Students' guidance and counselling.

2 Content courses Hours

Aims

The purpose of the content courses is to provide the B.ed. student with the competencies needed to apply his knowledge in problem solving, planning, preparations and fabrication of objects in the area of metalwork.
The B.ed. student shall also become familiar with newly related technical areas.
Another aim is to stimulate the B.ed. student in the way that individual aspects will form problem solutions and technical design.

2.1 Metalwork technology Hours

Objectives

- Material science
- Energy
- Related calculations
- Technical constructions
- Aspects on the technical development

2.2 Technical drawing, design and functions Hours

Objectives

- Formulation of problems
- Dimensions
- Sketching
- Design and function
- Modelling
- Technical drawing

2.3 Trade skills (Metalwork profiles) Hours

Objectives

- Machinework
- Forging
- Flating/welding
- Advanced benchfitting
- Fabrication

2.4 Foundry Hours

Objectives

- Moulding
- Casting
- Modelling

2.5 African metalwork, traditional and modern. Hours

Objectives

Handwritten note: This is a new subject to be added in 7th batch

2.6 Option courses — Basic Levels Hours

Objectives

- 2.6.1 Woodwork Hours
- 2.6.2 Building Hours
- 2.6.3 Home Economics Hours
- 2.6.4 Agriculture Hours

Remarks:

3 Project Hours

Aims

The purpose of the project is to stimulate the B.ed. student to solve a bigger problem in an individual way. This shall be done with an application of his knowledge in the area of metalwork both practical and theoretical.

Objectives

- Problem solution
- Planning
- Sketching
- Technical drawing
- Three dimensional practical work in metal or as a combination of metal and other materials.

4 Curriculum courses Hours

Aims

The purpose of the curriculum course is to give the B.ed. student a deepened knowledge of curriculum development. In that respect the B.ed. student shall develop an understanding of a curriculum as an important instrument of socialisation and skills upgrading.
The student shall also develop a basic knowledge of researchwork in the area of curriculum theory.

Objectives

- The procedure of curriculum development
- National aspects of curriculum development
- Individual aspects of curriculum development
- Interpretation of curriculum
- Evaluation, ~~planning~~ this endpoint issues
- Elementary researchwork

Appendix (xiii) - Cont.

Appendix of Curriculum Studies

3. TECHNICAL DRAWING FUNDAMENTALS 30 HOURS

AIMS

This course aims to develop in students

- Visualization skills
- Neatness and accuracy, respect for equipment
- Thorough grasp of principles of projection
- Ability to communicate instructions and information in order to make projects in Metal, using a variety of pictorial methods, either to scale using instruments or freehand.

CONTENT

- Basic Skills**
Cleanliness procedures - Care and maintenance of equipment
Drawing technique, basic plane geometrical drawing
Scale, accuracy, dimensioning, lettering
Practice 2 dimensional work from chosen metal projects.
- Isometric Projection**
Revise principles of first angle projection with visualization exercises, using common metal products.
- Pictorial Views**
Exercise the basic principles of:
Technical sketching
Oblique drawing
Isometric drawing
Perspective drawing (1 and 2 point)
Exploded drawing

14/12/01

3. Content courses hours

Aim

The purpose of the content courses is to provide the B.Ed student with the competence needed to apply his knowledge in problem solving, planning, preparations and fabrications of objects in the area of metalwork.
The B.Ed student shall also become familiar with nearly related technical areas.
Another aim is to stimulate the B.Ed student in the way that individual aspects will form problem solutions and technical design.

3.1 Metalwork technology ECS 3MW 01 60 hours

- 3.1.1 Material science
- 3.1.2 Energy
- 3.1.3 Related calculations
- 3.1.4 Technical constructions
- 3.1.5 Aspects on the technical development

3.2 Technical drawing, design and function

ECS 3MW 02
60 hours

- 3.2.1 Formulation of problems
- 3.2.2 Dimensions
- 3.2.3 Sketching
- 3.2.4 Design and function in use
- 3.2.5 Modelling
- 3.2.6 Technical drawing
- 3.2.7 Safety precautions

3.3 Trade skills (Metalwork practical)

ECS 3MW 03
60 hours

- 3.3.1 Machinework
- 3.3.2 Forging
- 3.3.3 Plating/welding
- 3.3.4 Advanced benchfitting
- 3.3.5 Fabrication

3.4 Foundry

ECS 3MW 04
60 hours

- 3.4.1 Modelling
- 3.4.2 Moulding
- 3.4.3 Casting

3.5 African metalwork, development from traditional to modern

ECS 3MW 05
60 hours

material
methods

3.6 Option courses

ECS 3MW 06
60 hours

- 3.6.1 Basic woodwork 60 hours
- 3.6.2 Building 60 hours
- 3.6.3 Home Economics 60 hours
- 3.6.4 Agriculture 60 hours

Remarks: Two subjects
Woodwork
Compulsory

COURSE OUTLINE FOR B.Ed. WOODWORK

CONTENT	NO. COURSES	NO. OF HOURS (REQUIRED)
1 Prerequisite course	1	66
2 Project	1	126
3 Content course	6	336
4 Professional courses	2	120

1 Prerequisite course **ECS 2 HW**

Aim

The purpose of the course is to upgrade the technical knowledge of the B.Ed students in order to continuing studies for B.Ed level in woodwork.

1.1 Science Fundamentals

Related mathematics
Related chemistry
Related biology

1.1.2 Woodwork Fundamentals

Joinery
Mechanisms
Fastening and Finishing

1.1.3 Technical drawing fundamentals

Design
Sketching
Drawing

1.1.4 Problem solving

Creativity
Imagination
Improvisation
Implementation

2 Project **ECS 360**

Aim

The B.Ed students ought to train their ability to take initiative to problem solving, plan effect and follow up work within different fields, qualification and needs through practical and technical work with woodwork they ought to develop their creative power and their feelings for aesthetic values.

2.1 Planning

2.2 Sketching

2.3 Technical drawing

2.4 Three dimensional practical work in wood

3 Content courses

Aim

The purpose of the content course is to provide the B.Ed students with the competence needed to apply his knowledge in solving problems, plan, prepare and fabricate objects in the area of woodwork. The B.Ed student shall also become familiar with near related technical areas. Another aim is to stimulate the B.Ed student in the way that individual aspect will form problem solutions and technical design.

3.1 Wood technology **ECS 34VNC1**

Felling and conversion
Classification of timber
Tree growth and structure
Seasoning
Defects and diseases in timber
Timber in common use
Timber products

3.2 Technical drawing **ECS 34VNC2**

Formulation of problems
Dimensions
Sketching
Design function in use and composition
Modelling
Chromatics
Isometric drawing
Technical drawing

2. RELATED SUBJECTS : METALLURGY AND WOODWORK 16 hours

2.1 MECHANICS AND ANALYSIS

- Simple machines
Inclined plane and wedge. The Wheel and Axle
The Screw Thread. The pulley system.
Simple gear trains, rotations, speed, force.
- Compound machines
Compound gear trains, rotations, speed, force
Compound pulley systems.

Mechanical Power Transmission

Principles of Mechanical Power Measurements
Friction, Lubrication

Mechanics of Fluids at Rest and in Motion

Fluid pressure and force. Fluid flow and speed
Pascal's Law, Bernoulli's principle
Volume and pressure relationships. Boyle's Law

Fluid Power

Pressure, Force and volume relationships
Potential and Kinetic energy

2.2 HEAT

- Sources and nature of Heat Energy
Temperature and measurements, Expansion and transfer of Heat
Cooling effects of vaporization. Conduction and convection.
Radiation and its control. Insulation.

2.3 HEAT (Cont)

- Heat Engines and Turbines
Principles of Steam engines and Steam Turbines
Principles of Internal Combustion Engines

2.4 LIGHT

- Sources, Application, Control and Measurements of Light
Sources and nature of Light. Application of refraction
Principles of lenses. Reflection. Refraction. Measurements of light
- Principles, Control and Applications of Colour
Principles of Colours. Newton's experiment with colour
Colours by absorption and reflection. Analyzing materials through colour, light and colour principles applied to measurement.

2.5 SOUND

- Values and protection of sound
Principles of sound. Production of sound
Sound waves. Pitch and Frequency. Resonance.
Insulation. Absorption. Measurement of sound.
Transmission and reproduction of sound

2.6 NUCLEAR ENERGY

- Production and Control of Nuclear particles
Relationship between matter and nuclear energy
Structure of the Atom. Characteristics of Radioactive materials
Circular and linear particle accelerators. Nuclear fission.
Producing fissionable materials. Applications of nuclear energy.
Thermonuclear reactions. Fusion energy.

2.7 BIOLOGY

- Earth as our total resource. The Ecological system and its balance.
Our natural resources. Industrial and Economic Development
Energy sources. Urbanisation. International review of Ecological
problems in different situations.

Appendix (xiv) - Cont.

UNIVERSITY OF KENYA Department of Curriculum Studies

WORKSHOP AND WOODWORK STUDIES FOR 1990

Workshop classification - 90 periods

A.I.B.S

The general aim is to develop an appreciation and understanding of the importance to education of workshop in order to create an efficient learning situation for 5-level teaching.

The course also aims to teach the B.Ed. students the necessary links between the preparation and planning aspects on one hand and effective and motivating teaching aspects on the other hand.

OBJECTIVES

The main objectives of the course are as follows:

- To give the students practical knowledge of the proper way to set up a teaching workshop.
- To teach the students to look critically upon existing conditions in order to motivate continuous improvements in their area of assignments.
- To make the students aware of safety facilities and regulations in order to work safely with secondary school pupils.
- To teach the students how to fabricate facilities to make the workshop teaching effective and motivating for students and more economic for society.
- To teach the students different types of teaching systems in the workshop in order to meet different types of teaching demands.

APPROACH

This is a practical course and as such it will be carried out in a workshop. The content will be integrated in the Teaching Methods course and the Drawing and Design course.

The coursework will be by compulsory assigned projects individually and in smaller groups. The projects will be related to workshop organisations - which means as well planning as pure workshop fabrication assignments.

Study visits to other educational institutions and industries will also be an essential part of the course to give ideas for the regular course work. Study visits will also be part of other courses in the B.Ed. programme and

...../2

- 2 -

will be co-ordinated for the most efficient outcome.

CONTENT

- Evaluation and constructive criticism of existing facilities in the workshop and the environment.
- Organisation of safety equipment and sign boards in the workshop.
- Material storing and transportation facilities in the workshop.
- Waste material storing.
- Tool keeping and storing facilities.
- Workshop layout in different aspects and on different levels of learning activities.
- Organising a workshop study unit for 5-level teaching.
- Teachers' responsibilities: responsibilities of other personnel of the Department.

ASSESSMENT

This course will be assessed equivalent.

The assessments will be through one major group assignment throughout the course and a number of individual course assignments.

Course Value 10 %

UNIVERSITY OF KENYA Department of Curriculum Studies

WOODWORK STUDIES - 1990

WORKSHOP CRAFT I

Course layout - 80 contact hours

Term 0 - I

A.I.B.S

The overall aim is to make the students confident in the great variety of woodwork techniques for 5-level teaching.

A number of different assignments will be expected to be completed. Emphasis will be put on the work with hand tools and the machines most commonly used. The students should also become familiar with other more specialised but common woodworking machines.

OBJECTIVES

- To improve the workmanship in the woodwork trade.
- To develop a critical attitude and approach towards quality of work.
- To solve given assignments as an individual or in smaller groups.
- To design, make and finish items in wood.

CONTENT

DRAWING, DESIGN AND PLANNING

- Work drawing.
- One design.
- Cutting lists and working plan.
- Teaching aids.

TOOLS

- Common hand tools.
- Specialized hand tools.
- Power hand tools.
- Maintenance.

MACHINES

- Common machines.

- 2 -

MACHINES (Cont.)

- Specialized machines.
- Maintenance of machines and machine tools.

MATERIALS

- Timber and boards.
- Veneer.
- Laminates.
- Applied materials.

CONSTRUCTION

- Joists.
- Gluing and glazing.
- Fastening and free assembly.
- Finishing.

APPROACH

The course is a workshop course, but will work closely with the parallel course - Wood Technology. Appropriate study visits will be organised in order to familiarise the students with other sectors of the woodwork field.

ASSESSMENT

This course will be assessed by Exam Equivalent. Two major course assignments throughout the course will be the basis for the assessment. (10 % of the total course), and a number of smaller assignments during

UNIVERSITY OF ZIMBABWE
Department of Curriculum Studies

B.ED. TECHNICAL SUBJECTS - WOODWORK AND METALWORK SKILLS 1988

Teaching Methods 60 contact hours.

PREREQUISITE

This is the Teacher Methodology course in the B.Ed. programme. The course will give teachers that have already completed a Teacher Training programme a higher competence in the professional area. After completion of this course, the students are qualified to take up further professional studies in corresponding areas at the B.Ed. level.

AIMS

The aim of the Methodology course is to give a wider understanding of the complexity of different factors interfering the classroom situation. It is also to give teacher's competence to implement a more scientific approach to the Teaching Skills. Another aim is to encourage teachers to take up research studies in areas of specialisation.

OBJECTIVES

- The course will give the students:
- A historical reference to teaching situations and dynamics in developing societies.
 - A reference of different philosophic ideologies and ideas influencing the classroom situations.
 - Knowledge of different types of educational systems.
 - Fundamentals of research methodology.
 - Further competence in teaching and learning materials development.
 - Further competence in teaching strategies and how to manage different classroom situations.
 - Fundamentals of social psychology and sociology.
 - Knowledge of student counselling and guidance.
 - Knowledge of curriculum issues related to subject areas.

APPROACH

The approach will be by lectures and assignments. The content will also be related to specialized subject areas.

- 2 -

CONTENT

- Library science.
- Historical background to Education and what influences development have in the classroom situations.
- Different philosophic ideologies, ideas and its power on academic and practical teaching subjects.
- Conflicts between academic and practical subjects in school systems and society.
- Outside factors influencing classroom activities.
- Centralised and Decentralised education systems and its effect upon the teaching conditions and learning situations.
- Research methodology: Statistics; Questionnaires; Interviews, report writing.
- Classroom relations; Fundamentals of social psychology, fundamentals of sociology.
- Techniques of questioning.
- Evaluation and assessment.
- Teaching and learning material development.
- Teaching strategies.
- Curriculum issues in subject related areas; planning development; effects.
- Curriculum revision - effects.
- Students' guidance and counselling.

UNIVERSITY OF ZIMBABWE
Department of Curriculum Studies

WOODWORK COURSE OUTLINE FOR 1988

WOODWORKING TECHNOLOGY

Term 0 - 3 60 contact hours.

AIMS / OBJECTIVES

- To develop the students' theoretical and practical understanding of the woodwork trades wide range of materials.
- To improve and widen the students' knowledge and ability to handle and assess proper work shop environment.
- To develop the understanding of the situation in the Wood Industry and the Forestry work, especially in Zimbabwe.
- To arrange a number of appropriate study visits e.g. to the Forestry Department, Sawmills, Furniture Industry, etc.

COURSE

MATERIALS

- Timber and Boards.
- Veneers.
- Finishes.
- Adhesives.
- Fastenings.

THE WORKSHOP

- Planning and Layout.
- Bench Shop and Machine Shop.
- Tools and Machines.
- Maintenance.

WOOD INDUSTRY

- Milling and Manufacturing.
- Furniture Industry.
- Building Industry.

- 2 -

FORESTRY

- Ecology.
- Planting and Felling.
- Biology.

STUDY VISITS

- Related study visits in the above mentioned areas.

ASSESSMENT

A three hour written examination will be written at the end of the course. (10% of the total course).

3.

3.6 Option

- 3.6.1 Metal work
- 3.6.2 Building
- 3.6.3 Agriculture
- 3.6.4 Home economics

4. Curriculum course

Aims

The purpose of the curriculum course is to give the S.ed students a deeper knowledge of curriculum development in that respect. The S.ed students shall develop an understanding of a curriculum as an important instrument of socialization and individual development. The S.ed students shall also receive a basic knowledge of research work in the area of curriculum development.

4.1 Curriculum issues in woodwork

4.2 Curriculum development

4.3 National aspects of curriculum

4.4 Individual aspects of curriculum

4.5 Technology as an essential part of general education

4.6 Evaluation, revision and equipment

5 Methodology course

Aims

The purpose of the course is to prepare the S.ed students in the way that they can fulfill the profession as teacher in the secondary school in aspects of teaching and organizing, maintain and develop his workshop.

4.

5.1 Preparations

5.2 Production of teaching aids

5.3 Social psychology

5.4 Elementary research work

5.5 Evaluation and examination

5.6 Workshop responsibilities

6 Examination

Continuous assessment and final examination of the ten courses with the biggest emphasis on the practical project work.

UNIVERSITY OF ZIMBABWE
Department of Curriculum Studies

BACHELOR OF EDUCATION PROGRAMME 1988

EDUCATION MAGNIFICENT

PROFESSIONAL COURSE 2 SEMESTERS

SCIENCE FUNDAMENTALS 30 HOURS

TECHNICAL DRAWING FUNDAMENTALS 30 HOURS

AIMS

This course aims to develop in students

- (a) Visualization skills
- (b) Neatness and accuracy, respect for equipment
- (c) Thorough grasp of principles of projection
- (d) Ability to communicate instructions and information in order to make projects in Metal, using a variety of pictorial methods, either to scale using instruments or freehand.

CONTENT

- 1) **BASIC SKILLS**
Classification procedures - Care and maintenance of equipment
Drawing technique, basic plane geometrical drawing
Scale, accuracy, dimensioning, lettering
Practice in dimensional work from chosen metal projects.
- 2) **ORTHOGONAL PROJECTION**
Derive principles of first angle projection with visualization exercises, using common metal products.
- 3) **PICTORIAL VIEW**
Revisit the basic principles of:
Technical sketching
Oblique drawing
Isometric drawing
Perspective drawing (1 and 2 point)
Exploded drawing

14/12/81

3.3 Skill training (Practical work)

Machine work
Joinery (advanced)
Fabrication/constructions
Wood bonding
Veneering
Finishing processes
Fastening and fixturing
Maintenance
Safety precautions

3.4 Wood-turning

Wood-turning tools - sharpening and maintenance
Turning between centers
Turning on the faceplate
Boring long holes on the lathe
Polishing in the lathe
Wood-turning using lathe attachment

3.5 African woodwork

material

methods

3.6 Option

- 3.6.1 Basic metal work
- 3.6.2 Basic building
- 3.6.3 Basic agriculture
- 3.6.4 Basic home economics

Remarks: Two subjects. Metalwork compulsory

See Appendix 2

Professional courses
4.1 Curriculum Issues

- 1.1.1 in Technical Education

U.Z. - B.Ed. Building Syllabus - 1988

B. Ed. BUILDING COURSE OUTLINE

1988

One year, full time course, 4 terms, 34 weeks.

Term 0	8 weeks	11 Jan - 4 March	
Term 1	10 weeks	14 Mar - 30 May	starts with exam
Term 2	10 weeks	13 Jun - 19 Aug	ends with exam
Term 3	6 weeks (*)	27 Sept - 4 Nov	

10 courses, minimum 60 hrs. contact time each, as follows:

1. Building Preparation (T.O. & Science) BCS 29	(no exam)	55
2. Building Technology 1 BCS 39 01	contest	
3. Building Technology 2 BCS 39 02	contest	
4. Trade & Technical Skills BCS 39 03	5 x 10 =	50
5. Building Drawing & Design BCS 39 04		
6. Building Optics BCS 39 05		
7. Architectural Studies BCS 39 06		
8. Technical Certificate Issues BCS 39 07	10 x	
9. Teaching Methods BCS 39 08	(no exam) 5 x	15
10. Project: research/development work of students choice BCS 39 09		20

ENTRANCE REQUIREMENTS

Students should have a recognised Teaching Certificate in Building plus at least 3 years teaching experience at Secondary level + 5 'O' levels including English.

* = Equivalent to free

f = Basic Equivalent

Normal weighting of assessed courses: 70% Exam, 30% Coursework

BUILDING PREPARATION	BCS 29	COURSE OUTLINE 1988
Science Fundamentals 34 hrs		Coursework only
Mathematics 8 hrs		
Research Methods 6 hrs		Term 0
Technical Drawing 30 hrs		55

SCIENCE FUNDAMENTALS 34 hrs. Term 0

1. COMMON CORE: 12 hrs Combined lecture: Building, Woodwork & Network.

1.1 STATICS

Force, weight, density, units. Active and passive forces. Stability, centre of gravity, equilibrium. Tension, compression, capacity of materials to resist forces, tensile and brittle materials. Stresses & strains, modulus for, elasticity. Moments, overturning moments, levers. Resolution of forces, parallelogram of forces, triangle of forces. Simple numerical examples.

1.2 CHARACTER

Structure of matter, simple kinetic theory, thermal expansion, evaporation. Simple and composite, hydration of cement and plaster. Introduction to plastics. Introduction to metals, corrosion.

1.3 ELECTRICITY

What is electricity? Conductance and insulators. Voltage, current, resistance, power. Why the national grid operates at high voltage. Heating effect, electric lighting.

2. BUILDING RELATED SCIENCES: 12 hrs

2.1 HEAT

Energy and power, units. Conduction, convection & radiation. Temperature, conductivity, thermal capacity. How heavy masonry construction acts as a heat sink to reduce temperature fluctuations.

2.2 LIGHT

What is light? The eye. Light intensity: subjective and objective measures, units, threshold values. Reflectance, effect of wall colour on illumination level. Efficiency of light sources (incandescent, fluorescent, lamp and fluorescent tube).

2.3 SOUND

What is sound? The ear. Sound intensity, decibel scale. Sound transmission, air-borne & structure borne sound. Sound insulation and sound absorption.

2.4 WATER

Surface tension and capillarity, rising damp, porosity of various materials. Fluid pressure and domestic water supply, water pump.

MATHEMATICS FUNDAMENTALS 8 hrs. Term 0 Common with Woodwork & Network

Algebra, manipulation of formulae, Resurrection, SI units.

TECHNICAL SKILLS 8 hrs. Term 0 Common with Vets, Arts & Agric.

TECHNICAL SKILLS FUNDAMENTALS 30 hrs. Term 0 1 hr per week Dr. Smith, Tuesday morning

Aims

This course aims to develop to students:

- Visualisation skills
- Neatness and accuracy, respect for equipment.
- Thorough grasp of principles of projection
- Ability to draw buildings and parts of buildings using a variety of pictorial methods, either to scale using instruments or freehand.

CONTENT

1. BASIC SKILLS

Classroom procedures. Care and maintenance of equipment. Drawing technique, types of line, sheet layout. Scale, accuracy, dimensioning, lettering. 2 dimensional work with instruments, representing usefulness and accuracy, quality of drawings e.g. various block patterns, visualisation, tracing.

2. FIRST ANGLE PROJECTION

Derive principles of orthographic projection, visualisation exercises in 1st angle orthographic. Practice to use of projection lines, e.g. using simplified house shapes.

3. PICTORIAL VIEWS

Pictorial projections: Isometric, Oblique, Semi-isometric, 1 and 2 point perspective.

Exercises in pictorial drawing, both with instruments and freehand.

ARCHITECTURAL STUDIES BCS 39 06 COURSE OUTLINE 1988

70% Exam (exam) 30% Coursework, Terms 0 & 1

1. HISTORY OF ARCHITECTURE 20 hrs

1.1 Overview of Architectural Styles

Classical architecture: Greece & Rome. Medieval architecture in Europe: the Gothic style. Renaissance architecture. The Industrial revolution, Victorian architecture. Arts & Crafts movement, Art Deco. The Modern Movement: International style, Bauhaus, Gropius & Wright. Recent trends: High-Tech, Post-modern classicism etc.

1.2 Zimbabwe Architecture

Local traditions, domestic architecture, Great Zimbabwe. Early colonial architecture in Zimbabwe, interaction between colonial & vernacular. (Dr. Jackson). Development of modern architecture in Zimbabwe.

2. THE HOUSING "PROBLEM" 20 hrs Dr. Robinson

2.1 Housing, as introduction

Demand and supply, the economics of housing. Housing as an expression of culture. Urbanisation in Africa/Zimbabwe. What is the housing problem? too many people? low standards? health risks? poor design? lack of maintenance?

2.2 Developing a housing strategy.

aims & objectives. background research. demographic analysis, who for and how many? functional/physical analysis, how do they live? employment and income, what can they afford? needs projection, how many units of what type at what costs? planning analysis, where can we build? the strategy: construction standards & methods. financing & ownership.

2.3 Examples of low-cost housing strategies

How build, rental accommodation. Kwekwe, Flats. How build, for sale: core houses, owner extension. Site & services, self-build. Upgrading existing stock.

2.4 House designs & layouts

A comparative study of various low-cost housing developments in Zimbabwe, past and present.

BUILDING TECHNOLOGY COURSE AND 01 COURSE OUTLINE

1. PURPOSE AND PURPOSE

- 1.1 Stages in the building process, roles of the main participants. Organisational systems and aids. Introduction to tendering and contracts.
- 1.2 Factors to be considered in building design. Changes in the building process: traditional, modern and system building. Rationalisation and industrialisation.
- 1.3 Approaches to analysing the building as a product. The C/D/D system. Overview of main structural types. Materials: masonry, concrete, steel, prefabricated components.
- 1.4 Organisation on site, approaches to test analysis, classification of processes. Assessment, accuracy, tolerance. Sequence of processes.
- 1.5 Site investigations, soil types and behaviour, preconstruction.

2. PRINCIPAL ELEMENTS

- 2.1 Substructure: foundation types, strip, pad, raft, pile, settlement, underpinning.
- 2.2 Walls: functions, overview of wall types, materials bricks and blocks, stone, masonry, cavity walls, walls to the by law, empirical construction strength and stability, building, lateral support (tower frame, steel walls).
- 2.3 Openings, treatment at head, sill and jamb, lintels, edge stiffening, floor openings.
- 2.4 Floors: masonry traditional concrete, suspended, timber-B.C. precast walls, masonry block, steel floor structures.
- 2.5 Roof structure: timber, trussed rafters, traditional carpentry roofs, couple, collar, gable & trussed gable roofs, valleys, hips and gables, steel roofs, industrial, north-light.
- 2.6 Structural frames: reinforced concrete, framework, typical reinforcement details, steel frame buildings, standard sections.
- 2.7 Staircases, staircases and chimneys.

3. PRACTICE AND PROBLEMS

20 hrs Dr. Oldfield & Gosses

This section to be taught through a mixture of lecture and site visits

3.1

Conditions of appointment, site inspection/survey, writing the brief, appointing consultants, contacting the local authority.

3.2 DESIGN STAGE

Architect's responsibilities, developing a proposal, design drawings, discussions with client, Q&A, consultation.

roles of:

Quantity Surveyor
Engineer
Services consultant
Relations with local authority, By-law, adjoining owners.

3.3 TENDERING

Contract documents: construction drawings, services layouts, schedule, specification, bill of quantities, associated sub-contractors, forms of contract, tendering procedure, pre-tender estimate, placing the contract, building law.

3.4 SUPERVISION

Appointment of Clerk of Works, site visits and meetings, variation orders, certificates for payment, completion, inspection and final certificate.

NOTES

Johnson, P. 1966 *Historic Buildings of Sussex* (reprint available)

On reserve:

Richards, J.R. *Historic Architecture of Sussex*Borl, P.R. *Architecture of Sussex*Porter, W & G. *Historic Architecture of Sussex*

3. INTRODUCTION TO STRUCTURAL ANALYSIS

- 3.1 Types of frame, elasticity. Estimate strength, safety factors and working strengths.
- 3.2 Compression structures. Design of loadbearing masonry, slender column ratio, stiffening factors, permissible stresses.
- 3.3 Theory of bending, beams and lintels, point loads and UDL, drawing simple bending moment and shear force diagrams.
- 3.4 Continuity, composite materials, Reinforced Concrete.
- 3.5 Connections: sliding, braced, rigid, simple lattice truss analysis.
- 3.6 Overview of structural design.
- 3.7 Strength of materials, properties & quality control of concrete.
- 3.8 Related group practical work.

4. OCCUPANT ELEMENTS

- 4.1 Doors and windows, functional requirements, overview of types.
- 4.2 Secondary elements in traditional construction, timber frames and linings, problems of fit and tolerance.
- 4.3 Steel door and window frames, sizes, dimensional coordination.
- 4.4 Types of door, louver doors, panelled doors, flush doors.
- 4.5 Window approaches, eavey height frames, slatted doors, patent glazing.
- 4.6 Balustrades, roof lights, suspended ceilings.

ASSESSMENT

900 Hours: 3 hr written paper, 1 hr exam.

300 Comments

TEACHING STRATEGIES AND 06 COURSE OUTLINE 1986

AIMS

To help teachers develop a wider variety of teaching strategies, & in particular to help them progress beyond a narrow teacher-training approach to technical education.

To help teachers to plan and teach lessons for the 'V' level Building Studies syllabus, with special emphasis on selecting & structuring content of suitable difficulty level.

CONTENT

TEACHING AND LEARNING 20 hrs

Aims & Objectives
Language & learning, pupil-pupil talk, group discussion methods.
Structural learning approaches, problem-solving activities.
Organising practical work, different types of practical lesson.
Creating a good learning environment.
Teaching/learning aids.

ASSESSMENT 12 hrs

Setting, moderating & marking questions
Multiple choice & structural responses, building up a question bank
Drawing and visualisation questions
Simulation & difficulty indices
Setting & marking Practical work.

RECORD-TEACHING 20 hrs

Four group teaching 10-15 minute lessons on 'V' level topics, followed by class discussion & video replay.

CONCEPTS ASSESSMENT

1. Lesson Planning Assignment
2. Exam setting assignment
3. Teaching aid assignment
4. Record-teaching grade

(a) B.T.C. Metalwork Syllabus - 1986-88

B.T.C. METALWORK SYLLABUS

METALWORK DEPARTMENT

METALWORK SYLLABUS

ARTISAN WRIT

Introduction

The course is designed to fulfill the requirements of the current four year training programme of first and third year in collages, second and fourth years on full time teaching.

The course of study at collage will consist of six timetabled two hour sessions per week divided into four sessions spent on workshop practice and two sessions on theory/methods and one session on graphic communication skills.

1. Aims

- 1.1 The aim of the course is to produce a competent secondary school teacher with a specialisation in Metalwork.

2. Objectives

- 2.1 At the end of the four year course the trainee teacher will possess:-

- 2.1 sufficient knowledge of educational methodology to create meaningful learning situations in the classroom and workshop.
- 2.2 sufficient knowledge and skill in workshop practice as to be able to demonstrate and supervise the acquisition of skills and processes as required by the metalwork syllabuses in current use in the secondary schools.
- 2.3 sufficient knowledge of the theory required by the syllabuses in 2.2 to explain it clearly and simply to substantiate the various skills/processes.
- 2.4 sufficient knowledge of graphic communication skills to be able to:
 - (a) prepare working drawings in orthographic projection to an acceptable standard.
 - (b) present information allied to his teaching in a manner that can be readily understood by pupils.
 - (c) to express their ideas clearly in graphic form.
- 2.5 Knowledge of the working tools of the other technical subjects to enable him/her to recognise them and to clearly explain and demonstrate their uses.
- 2.6 Knowledge of the design process so that he/she can apply it to the solution of practical problems.

3. Approach

The approach will be through

- 3.1 discussion, analysis of the various skills/processes involved in Metalwork in schools.

cont/.....

-3-

- 3.2 discussion, sequencing of the skills/processes to provide logical progression taking into account the developing capabilities, intellectual and physical, of secondary school pupils.
- 3.3 discussion/small group study of the design of suitable articles to fulfill the requirements of 3.1.
- 3.4 demonstration by the lecturer, of the correct workshop methods related to the course.
- 3.5 workshop practice of the skills/processes demonstrated in 3.4.
- 3.6 personal/group preparation of the theory related to 3.4 by reading /research.
- 3.7 exploration through worksheets for investigation in, various aspects of metalworking.
- 3.8 lectures by visiting speakers including demonstration and films.
- 3.9 visits to industry /enterprise involved in work related to the course.
- 3.10 peer group teaching practice, schools observation (first and third years) organised full time teaching practice, (second and fourth years).
- 3.11 Distance Education material (second years) depth study and design module (fourth years).
- 3.12 Cross links with other technical departments.

Content

4.1 Methodology

- 4.1.1 General aims of Education
- 4.1.2 General aims of Education through the material subject
- 4.1.3 History of technical education
- 4.1.4 Qualities of a teacher
- 4.1.5 How curricula is planned, formulation/planning of syllabuses schemes and lessons
- 4.1.6 Assessment of practical work, assessing teaching.
- 4.1.7 Teaching methods
- 4.1.8 Teaching skills
- 4.1.9 Administration involved in running a workshop or department
- 4.1.10 Peer group teaching sessions
- 4.1.11 The role of technical education in society
- 4.1.12 Future direction of the technical education
- 4.1.13 Relationship of technical teaching to industrial training.
- 4.1.14 The role of non-formal and informal education

4.2 Theory

- 4.2.1 History - brief history of metalcraft from early times to the present day with emphasis on local methods ancient and modern, including the impact of the Industrial Revolution.

4.2.2 Materials

- An outline of the manufacture of ferrous metals from ore production to the finished material, including castings and steel and alloy steels
- An outline of the manufacture of non ferrous metals from ore production to the finished material, including copper, brass, bronze, aluminium and its alloys. Also alloys of tin and lead
- Identification, by colour, form and simple workshop test of the metals and common alloys specified above.
- Working characteristics in terms of hardness, surface toughness, brittleness and corrosion resistance, and the effects of these features upon their suitability for use; and the methods by which they may be worked both in schools and industry by forging, casting, rolling, drawing, extruding, pressing, planing and machining.
- An awareness of the suitability of commonly used non-metallic materials e.g. wood, plastic, glass

4.2.3 Heat Treatment

- simple heat treatment applied to the materials listed above, covering appropriate annealing, normalising, hardening, and tempering, case hardening by chemical methods.

4.2.4 Basic understanding of the fundamentals of electricity in Metalwork

- Basic understanding of mechanics and structures as used in machines, motors, engines and buildings to assist in the understanding of the principles of design.

5. Practical

A design and making approach will be incorporated in all practical work areas.

4.3.1 Safety precautions

- an understanding of the common safety precautions to be observed in the school workshop as defined in circular(PHS) 198 of 1975.

4.3.2 Hand Processes

- (a) Use, care, maintenance and construction of making out, testing and measuring tools.
- (b) methods of joining, metals including riveting soft soldering, silver soldering brazing, gas arc and resistance welding and the theoretical treatment of forge welding. Use of glues and adhesives.
- (c) Cutting, internal and external threads by hand.
- (d) Forge processes including management of the forge fire, drawing down upsetting, flanging, swaging, punching, drifting and twisting.
- (e) Sheet metal processes including folded safe edge, wired edge, lap joint, folded grooved seam, flanging a circular disc rolling, punching.

cont/.....

-4-

- (f) Section metalwork parts free including hollowing, slitting, raising silver soldering, fitting 1/2 turned form planishing.
- (g) Finishes decorative processes and treatments applied to fitting, forgework, sheet and bent metalwork.
- (h) Study of the action of heat and machine cutting tools commonly used in apt workshops.
- (i) Use of lubricants and coolants, both in hand and machine processes.

4.3.3 Machine processes

- (a) Drilling machine - construction and use of the pillar portable and hand drilling machines the features of the twist drill, the drill procedure.
- (b) Bench grinder - a general understanding of the machine including the safe and correct handling in the grinding and sharpening of tools.
- (c) Centre lathe - construction and use of the centre lathe including three and four jaw chucks, turning between centres cutting. The use of drills, taps and dies in the lathe. Paper turning using the compound slide. Simple form tools, preparation and use of simple moulds and similar holding devices.

4.3.4 Foundry work

- making simple castings using basic patterns.
- Maintenance of an understanding of the necessity for maintenance programmes in the workshop to (a) ensure safe working conditions are maintained (b) prevent equipment failure and consequent loss of facilities.

4.4 Technical Sketching

- 4.4.1 Freehand sketching
- 4.4.2 Pictorial sketching in isometric oblique and perspective projection.
- 4.4.3 Orthographic projection
- 4.4.4 Geometrical construction.
- 4.4.5 Sectioning
- 4.4.6 Surface developments
- 4.4.7 Design and design process

5. Distance Education

5.1 Report Task

- Extension and consolidation of basic skills in:
 - (a) Theory drawing and design
 - (b) Practical work
- This will be achieved through reading and research requiring:
 - (a) the design and production if possible of simple projects to be made by pupils.
 - (b) written reports about metalwork theory and workshop practice.

5.2 Project Task

- Attainment of a higher level of accomplishment in:
 - (a) Theory drawing and design
 - (b) Practical work
- This will be achieved through reading and research requiring:
 - (a) a comparative depth study - one of a number of eight

Appendix (xvi). (a) - Cont.

- metalwork disciplines.
(b) answering of a design assignment.

6.1 First Year coursework 60% comprising

- (a) Practical component of a minimum of four projects completed during the first year. 25%
- (b) Theory component of a minimum of four assignments completed during the first year. 10%
- (c) Methodology component of a minimum of three collages based on assignments completed during the first year. 10%
- (d) Graphic skills component of a minimum of six assignments completed during the first year. 10%
- (e) Mid year examination 10%

6.2 Examination 40% comprising

- (a) Practical - a formal examination requiring the production of a specimen of four set pieces in the major metalworking disciplines. 25%
- (b) Theory drawing and design 10%
- (c) Methodology 10%

6.3 Second Year Coursework 10%

- 6.3.1 Theory 5%
- 6.3.2 Drawing 5%
- 6.3.3 Design 5%

6.4 Third Year

Coursework 60% comprising

- (a) Practical component of a minimum of four projects completed during the third year. 25%
- (b) Theory component of a minimum of four assignments completed during the third year. 10%
- (c) Methodology component of a minimum of three collages based on assignments completed during the third year. 10%
- (d) Graphic skills component of a minimum of six assignments completed during the third year. 10%
- (e) Mid Year examination 10%

6.5 Examination 40% comprising

- (a) Practical
 - (i) Formal examination requiring production of a set piece within a one week period.
 - (ii) Production of one from a series of six design based projects within a six week period. Evidence of compliance with the various stages of design must be produced with the submission of completed project.
- (b) Methodology 10%
- (c) Theory drawing and design 10%

cont/....

- 7 -

FORCE SYSTEMS, MOMENTS & STRESS DISTRIBUTIONS

- (i) The nature of a force
- (ii) Magnitude and direction, direction and line of action
- (iii) The moment of Force and Torque

FRICITION

- (i) Laws of Friction
- (ii) Self Friction and Rolling Resistance

MOTION

- (i) Distance
- (ii) Speed
- (iii) Velocity
- (iv) Acceleration

POWER, ENERGY AND TORSION

- (i) The concept of work
- (ii) Work done by a force torque
- (iii) Energy

10.0 Assessment

10.1 FIRST YEAR

COURSEWORK COMPONENT

- (a) WORKSHOP DRAFT/PRACTICE: a minimum of 3 projects completed during first year, 15%.
- (b) WORKSHOP THEORY/MATERIALS: a minimum of four assignments completed during first year, 10%.
- (c) Methodology component: a minimum of four assignments completed during first year, 10%.
- (d) Graphic communication: a minimum of six assignments completed during first year, 10%.
- (e) Workshop calculations: a minimum of six assignments completed during first year, 10%.
- (f) Design and Technology: a minimum of three projects completed during first year, 10%.
- (g) Mid year exam, 5%

6.6 Fourth year Coursework 50% of four's year final mark comprising

- (a) Depth study 25%
- (b) Design assignment 25%

6.7

- Fourth year Final mark 100% - 20%
 - (a) Depth study 25%
 - (b) Design assignment 25%
 - (c) Third year final coursework 40%
 - (d) Third year final exam 10%

END

- 8 -

10.2 EXAMINATION 40% comprising

- (a) PRACTICE - a formal examination written over four hours 10%
- (b) WORKSHOP - Theory, Drawing and Design 10%
- (c) METHODOLOGY 10%
- (d) WORKSHOP CALCULATIONS 10%

10.3

End Task

COURSEWORK - Comprising 2 assignments. First assignment given in second term and second assignment given in third term.

10.4

End Task

COURSEWORK COMPONENT - 70%

- (a) WORKSHOP DRAFT/PRACTICE: a minimum of three projects completed during third year. 10%
- (b) WORKSHOP THEORY/MATERIALS: a minimum of four assignments completed during third year. 10%
- (c) METHODOLOGY COMPONENT: a minimum of three assignments given during third year. 10%
- (d) GRAPHIC COMMUNICATION: a minimum of six assignments given during third year. 10%
- (e) WORKSHOP CALCULATIONS: a minimum of six assignments given during third year. 10%
- (f) DESIGN AND TECHNOLOGY: a minimum of one project given and completed during third year. 1
- (g) Mid Year Exam. 25
- (h) Depth of study given and completed in third year. 10%

10.5

EXAMINATION COMPONENT - 30%

- (a) A practical/draft practice paper 10%
- (b) Workshop Theory Drawing and Design Paper 15
- (c) Methodology Paper 25
- (d) Workshop Calculations Paper 25
- (e) A final display of all third year projects. 25

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10.6 FINAL MARK FOR END OF COURSE - COMPOUND

- (a) THIRD YEAR COURSEWORK 30% - 60%
- (b) DEPTH STUDY 10% - 20% coursework
- (c) EXAMINATION TAKEN IN THIRD YEAR 10%

10.7

- (i) that successful completion of the course at the end of third year depends on the student's successful completion of all the three components in 10.2.
- (ii) Failure to sit for or submit each of the components in 10.2 above shall be referred in that component for one coming term pending the successful completion of that component.

100

(b) B.T.C. Metalwork Syllabus - 1989

METALWORK SYLLABUSMETALWORK BY PRODUCTMETALWORK BY STAGEA. INTRODUCTION

This is a syllabus for a three year course in metalwork.

It caters for a training programme where the first year and third year are spent in colleges and the second year is spent on full time teaching.

The following main areas are available: in the new syllabus,

- (i) Methodology
- (ii) Design and Technology
- (iii) Workshop/Practice/Theory
- (iv) Graphic Communication
- (v) Distance Education
- (vi) Workshop Calculations

B. AIMS

There is a focus on the emphasis on both manipulative cognitive skills. Regarding the educational needs of a developing country, the introduction of elements of Designing, and making, and technology, develops skills in problem solving and creative thinking while the introduction of workshop calculation enhances the inter-rial application of scientific approach to problem solving.

C. OBJECTIVES

1. To introduce the student to the background and philosophy of Design and Technology and current developments in Technical Education.
2. To develop the student's technical knowledge and personal technical capability.
3. To develop the student's capacity to apply design strategies to human participation and problem solving focusing particularly the capacities to investigate, research, hypothesize and plan, design and make and finally to test and evaluate solutions.
4. To extend the student's experience and competence in working with tools and materials.
5. To examine contemporary educational and curriculum issues that underlie doing and making activities.
6. To produce a competent secondary school teacher with a specialization in metalwork.

- 3 -

6. Assessment and examinations

- its place and role in the curriculum
- assessment of design projects
- assessment of teaching skills

9. Some theories of education and how they can be applied in the teaching of craft subjects.

- development of the self concept
- factors influencing the self concept
- influence on development of children
- the theory of basic needs

Particular attention is given to how each of the above elements can make the teaching of craft subjects effective.

10. Administration of a workshop or a department.11. The role of Design and Technology/Design education in the general development of all children.12. The qualities and the role of the teacher in development programmes, creating climates for learning.13. The role of educational teaching media.14. Peer group teaching.15. Trends and future directions and development of curriculum programmes.16. School and community developmentD (ii) TECHNOLOGY AT WORK

1. This component of the course should help students to develop values, skills and knowledge through analytical and investigative practical activity

- (a) Mechanisms
- (b) Structures
- (c) Pneumatics
- (d) Electricity
- (e) Basic electronics

E (iii) COMPOSING THEORY/MAKING

1. A theoretical and practical study of a range of materials

- (i) Ferrous metals including cast iron mild steel and alloy steels.
- (ii) non-ferrous metals including copper, brass, bronze, aluminium, lead and zinc and their alloys

D. ACHIEVEMENT OBJECTIVES

At the end of the three year course trainee teachers should be able to

1. Recreate sufficient knowledge of educational methodology and to create meaningful learning situations in the classroom and workshop.
2. Demonstrate and supervise the acquisition of skills/procedures as required by the metalwork syllabuses at secondary school level.
3. Develop communication skills i.e.
 - (i) express ideas clearly in graphic form
 - (ii) present information orally to his teaching in a manner that is readily understood by pupils,
 - (iii) to communicate design proposals
4. Develop a high degree of competence in manipulative skills.
5. Implement educational theory to the teaching of metalwork.
6. Apply and implement the concepts and skills in problem solving.

MEANS OF TEACHING AND LEARNING

These will include, as appropriate,

- lectures by resident and visiting lecturers
- seminars
- groupwork
- industrial visits and films
- schools observation and full time teaching.

8. CONTENT8 (i) HISTORY

1. This section of the syllabus focuses on national philosophy, national needs and curriculum change and development a case study of Technical Education and current developments and functions of education in selected countries.

The structure and general aims of education system in Maldives.

2. The history of technical subjects and the place of design and technology in the school curriculum.

- 2.1 The concept of community, self help initiatives and the role of design and technology in social development.

- 2.2 Organization and planning of curriculum, syllabus scheme and lesson plans.

- 4 -

- (iii) Finishes including thermosetting and thermoplastic
- (iv) Wood and glass

Emphasis on all the materials is given to methods of manufacture

- working properties and uses
- methods of forming or working these into shape
- structure control/molecular structure of the above materials to understand their basic, Hot and Cold

8 (v) DESIGNING AND MAKING CRAFT PROJECTS

- (i) An introduction to practical product design and workshop activity. Emphasis is given to work of a multi-media nature.

- (ii) Safety precaution becomes an integral part of every element in the section.

To enhance craft skills emphasis should be put on.

8 (v) BASIC PROCESSES

- (a) Marking out and cutting tools
 - their use, care, maintenance and construction
- (b) Methods of joining materials including riveting, soldering (soft and hard), brazing, gas and arc welding, use of glues and adhesives on wood and plastics.
- (c) Forge processes including drawing upsetting, hammering, forging, punching and drifting and twisting
- (d) Sheetmetal processes including joints and safe edges, punching and rolling.
- (e) Sheet metalwork processes including slitting, blanking, raising planishing and annealing use of coils and lubricants.

8 (v) MACHINE PROCESSES

- (a) Bench grinder - construction and safe use of the machine
- (b) Drilling machine - construction and safe use of portable pillar and radial machines
 - twist drills and drilling techniques
- (c) Centre lathe - construction and manipulation of the lathe including maintenance
 - lathe tools accessories and turning processes.

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(d) Milling machines:

Construction and safe manipulation
including maintenance milling tools
accessories and milling processes

(e) Shaping machines:

Construction and safe manipulation
including maintenance,
tools and operations.

W(4.5) PISTON PUMP - Simple and casting
- Injection moulding in plastic.

W(4.6) WELDING - ELECTRIC ARC
- the need for maintenance programmes in the workshop.

W(5) TECHNIC & GRAPHICS

Developing expertise in drawing, sketching
modelling techniques useful in communicating
design ideas, and standard conventions.

Emphasis will be put on

1. free hand sketching
2. standard drawing conventions
3. pictorial drawing in isometric oblique and perspective projections
4. orthographic projections
5. Geometrical constructions
6. sectioning
7. surface developments
8. pencil shading
9. texture and tone
10. use of ink and gloss in drawing
11. assembly and exploded drawing

W(6) TECHNICAL SKILLS

An extension and consolidation of basic skills in

- (a) practical teaching
 - (b) graphic communication
 - (c) internalisation of theories of education.
- A project which will require the student to
research into one particular aspect of metalwork

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W(7) MACHINE CALCULATIONMEASUREMENT

- (i) Introduction to metric measurements
- (ii) The length of a line
- (iii) The area of a plane figure
- (iv) The area of irregular plane figures
- (v) Volume
- (vi) Masses

STRAIGHT AND TRANSFORMATION

- (i) Use of symbols
- (ii) Simple formulae and equation
- (iii) Simple transpositions of formulae
- (iv) Derivation and simple allied equations

GEOMETRY AND TRIGONOMETRY

- (i) The measurement of angles
- (ii) Basic trigonometry

GRAPHS

- (i) The pictorial presentation of data
- (ii) The straight graph
- (iii) Solution of equations by graphical methods
- (iv) gradients

MECHANICS

Areas, volumes simple formulae for
plane figures, squares, rectangles
sectors and segments of circles

TECHNICAL SKILLS

- (i) Simple calculations of speeds and feeds, for lathes,
drilling machines shaping machines and milling machines;

TECHNICAL SKILLS

- (i) Purpose of fits - explanation
simple calculations

TECHNICAL SKILLS

- (i) Types of lenses
- (ii) Principle of camera
- (iii) Centre of gravity

TECHNICAL SKILLS

- (i) Temperature scales
- (ii) Heat transfer, transmission
- (iii) expansion and contraction

B.T.C. Woodwork Syllabus 1986-88

BETWEGE TEACHERS' COLLEGE

SYLLABUS

1. GENERAL AIMS

To Produce Teachers who are capable of:-

- 1.1 teaching woodwork up to Form four level.
- 1.2 being creative and solving problems related to woodwork.
- 1.3 helping the community to make technical progress by setting an example in the schools in which they teach.

2. OBJECTIVES

At the end of the course the teachers should be able to:

- 2.1 teach effectively both in workshop and classroom situations.
- 2.2 design, organise, maintain and develop a typical woodwork shop.
- 2.3 Apply the skills and principles acquired through project making, problem solving, woodwork theory, basic carpentry and joinery and technical graphics.
- 2.4 design and make practical exercises involving basic joinery and cabinet making.
- 2.5 display initiative, creativity and an ability to adapt to a variety of working conditions and situations.
- 2.6 show interest and involvement in the activities and development within the school, community and the nation as a whole.
- 2.7 carry out research work and to apply the relevant information effectively; display depth of understanding of subject matter; express ideas concisely, accurately and logically and treat chosen organisms in a scholarly manner.

3. Approach

To achieve the outlined objectives the approach will be through:-

- 3.1 mass lectures, group and individual tutorials, written assignments, simulation teaching exercises and teaching practice.
- 3.2 planning and supervising activities to expose student teachers to typical managerial and organisational skills.
- 3.3 mass lectures, group and individual tutorials, written and reading assignments to foster the development of subject expertise and confidence.
- 3.4 technical graphics, design and content sequencing tutorials.

6. INTERNAL ASSESSMENT (COURSEWORK)

This will include all individual projects, group projects and assignments given during the year.

7. FINAL ASSESSMENT

This will include coursework, mid-year and final examinations.

8. PROPORTIONS

The components of the course will be as follows:

8.1	Coursework	(i) Applied Education	15%
		(ii) Practical	40%
		(iii) Technical Graphics	20%
		(iv) Theory	25%
		Total - 100%	
8.2	Examination	(i) Applied Education	15%
		(ii) Practical	50%
		(iii) Technical Graphics	20%
		(iv) Theory	15%
		Total - 100%	
8.3	Coursework		66 2/3%
	Exam		33 1/3%
		Total - 100%	

EXPANDED CONTENT

9.1 APPLIED EDUCATION

- 9.1.1 Background to technical subjects.
- 9.1.2 Scheme of work, lesson plans and records of work.
- 9.1.3 Workshop organisation and maintenance.
- 9.1.4 Assessment and evaluation.
- 9.1.5 Motivating woodwork classes.
- 9.1.6 Safety in the workshop.
- 9.1.7 Teaching methods - the application.
- 9.1.8 Peer group teaching and or micro-teaching.
- 9.1.9 Teaching observation and practical teaching (preparation and problems encountered).

- 9.1.10 expanding student teachers to the experiences found in by: a) workshop situations through the allocation of workshop duties, simulation teaching and teaching practice.
- 9.1.11 involving the student teachers in college activities that require self sacrifice and commitment to group or community projects as shown in education with production.
- 9.1.12 guided reading tasks, written assignments and depth study tasks.

4. CONTENT

The content used to support the above approach will be as follows:

- 4.1 teaching methods for practical and classroom lessons.
- 4.2 workshop management, organisation, maintenance and development.
- 4.3 theory, models and projects incorporating the skills cited in 3.3.
- 4.4 basic joinery and cabinet making.
- 4.5 problem solving and its related factors.
- 4.6 workshop responsibility, teaching practice, the design and manufacture of artefacts for the school and community.
- 4.7 research methods, logical arrangement of written assignments and depth studies and scholarly development of acquired.

5. METHOD OF ASSESSMENT

Method of assessment will be as follows:

- 5.1 continuous assessment of simulation teaching, teaching practice and all the necessary ancillaries.
- 5.2 continuous assessment of areas in 3.3 including the assigned written or practical tasks.
- 5.3 evaluation and continuous assessment of theory and practical tasks.
- 5.4 evaluation and continuous assessment of projects involving joinery and cabinet making.
- 5.5 these necessary ingredients of the practical teaching profession are duplicated in all the components of the discipline. Their commandment will appear in applied education, practical, technical graphics and theory.
- 5.6 evaluation and continuous assessment of both individual and group contributions will be made above and where applicable.
- 5.7 evaluation and continuous assessment of individual written assignments and depth studies given during the course.

9.2 PRACTICAL

- 9.2.1 Butt joints.
- 9.2.2 Lap joints.
- 9.2.3 Housing joints.
- 9.2.4 Halving joints.
- 9.2.5 Bridle joints.
- 9.2.6 Mortise and tenon joints.
- 9.2.7 Decorative processes.
- 9.2.8 Wood finishing and finishes.
- 9.2.9 Use of hand tools and machines.
- 9.2.10 Use and fitting of accessories (Theory 4.4).
- 9.2.11 Principles of design.

9.3 TECHNICAL GRAPHICS

- 9.3.1 Projections - first angle orthographic, isometric and oblique.
- 9.3.2 Free - hand sketching.
- 9.3.3 Geometrical constructions - for typical workshop situations.
- 9.3.4 Arch curves.
- 9.3.5 The ellipse.
- 9.3.6 Geometrical solids.
- 9.3.7 True lengths e.g. hip rafters and jack rafters.
- 9.3.8 Fundamentals, elements and Principles of Design.

NOTE:

Appropriate exercises incorporating the above, will be designed by (a) students and lecturers.

(b) students alone and made by the students throughout the course.

9.4 THEORY

- 9.4.1 Tools - use, care and maintenance.
- 9.4.2 Machines - use, care and maintenance.
- 9.4.3 Timber - the tree, wood properties, classification of timber, wood conversion, wood seasoning and use.
- 9.4.4 Accessories - adhesives, nails, screws, abrasives, wood finishes, hardware, fittings and fastenings.
- 9.4.5 Construction - flat frame, lean to, corner, etc.

MILNERS' TEACHERS' COLLEGE

MILNERS' DEPARTMENT : 21 January 1988

Items to be covered in the proposed building syllabus.

General Aims

To produce teachers who are capable of:-

- teaching up to S.J.6. (i.e. after 1st year in college) and eventually up to Pure four (i.e. after 3rd year in college)
- being creative and solve technical problems related to their major subject with confidence.
- helping the community they live in to make technical progress by settling an example in the schools they teach.

1. Objectives *(These are objectives which are to be achieved by the end of the course. They are to be achieved by the end of the course.)*

- 1.1 lay bricks in different bonds with a sound knowledge in theory, forming - design, basic plumbing, and basic carpentry and joinery.
- 1.2 pass on and develop the practical skills and abilities to their pupils in brickwork, block lay & joinery, plastering wall finishes and basic plumbing.
- 1.3 adapt and be able to relate to the technical development of a school and the community.
- 1.4 examine a piece of building and relate its design to the scientific principles upon which it is based.
- 1.5 develop interest of the subject in the pupils.
- 1.6 read and make properly dimensioned and scaled drawings in accordance with an appropriate standard. B.S. 1192 - 1985
- 1.7 think and tackle building problems with confidence and to have proficiency in practical teaching of craft work to an acceptable professional level.

2. Approach

The approach will be through:-

- 2.1 (i) building discussions to analyse the common building technology and reach a conclusion as the sequence on how will be dealt with in a class of beginners.
- (ii) developing an awareness and understanding of the use of acceptable methods. The skills and processes involved when making different.
- 2.2 designing practical projects with students, incorporating all the necessary brickwork, plus elementary joinery, plumbing and wall finishing exercises. These should get more complex as the students gain confidence and master the skills.
- 2.3 giving students written exercises in the theory of building. Help and guidance will be given.
- 2.4 conducting drawing theory and practical lectures to show the various structures and constructions. Student involvement in individual or group work.
- 2.5 (i) creating imaginary situations and discussing how one can best make use of the resources available.
- (ii) giving written assignments as reinforcement.
- (iii) encouraging students to identify need of the college campus or schools and suggesting the manner in which the needs could be fulfilled, e.g. flower beds/paving.
- 2.6 peer group teaching, mini-teaching, teaching practice.
- 2.7 educational field trips to building industries.

SW...

-5-

6. Requirements

1. Demonstrations for all basic skills.
2. History of technical subjects
 - (a) in schools in Britain
 - (b) in schools in Europe
 - (c) in schools in Zimbabwe
3. Scheduling, planning and recording of work.
4. (a) Peer group teaching
- (b) Mini-teaching
5. Development of teaching and learning skills.
6. Motivation
7. Organisation and Assessments.
8. Concepts of safety and first aid.
9. Departmental responsibilities - class budgeting and stock control.
10. Workshop management, class control and discipline.
11. Ability to make and use all types of S.F.S. equipment and materials to best advantage.
12. Ability to use all hand and power tools at demonstrations and to improve where necessary.
13. Ability to pass information precisely, effectively, and accurately to pupils.
14. Maintenance of high standard of oral and written language, with particular emphasis on technical terminology.
7. Overall Assessment scheme.
 1. Test one - main subject - course work 40%
 - Examinations 60%
 2. Test two - Function of education - Symbol.
 - Distance education and course work 100%
 3. Test three - Main subject coursework 70%
 - Examinations 30%
 4. Test four - Function of education - Symbol main subject curriculum study - individual study 100%
- 8.8. Funding mark for practical projects in 10% of the total mark allocated to that part of work (practical zone project)
9. References books for assignments.
 1. Network for apprentices (J.C. McGee)
 2. Brickwork Vol. 1 and 2 (V.G. Bush)
 3. Building construction vol. 1 and 2 (V.G. Bush)
 4. Block laying and masonry (B.S. James)
 5. Good examples in technical drawing (J. Bland)
 6. Building drawing and geometry (P. Miles)
 7. Plumbing books 1 and 2 (A.S. Newman)
 8. Calculations for building craft students. By Frank L. Robinson.

2. Content : Theory :

1. Tools and equipment
2. Knowledge of the materials
3. Theory of bonds and bonding
4. Mortars and concretes
5. Foundations and footings
6. Cavity wall construction and damp proofing.
7. Choice of site, setting out and use of dumpy level
8. Construction of floors, stairs and steps.
9. Trusses and lintels
10. First place construction
11. Ceilings and plastering
12. Carpentry and joinery
13. Painting and decorating.
14. Roofs in plumbing
15. Basic building actions.
16. Workshop calculations (basic)

3. PRACTICAL :

1. Individual practical skills projects
2. Group projects as required
3. Permanent group projects. (Education with production)
4. All practical projects are limited to the theory work which must precede practical.
5. Rural sanitation (Basic research toilet)
6. Visits to industry and construction sites.

4. DRAWING AND DESIGN

1. Free hand sketching.
2. Geometrical drawing.
3. Design and technology in - Architectural drawing and civil engineering.
4. Model making - (Models related to designs)

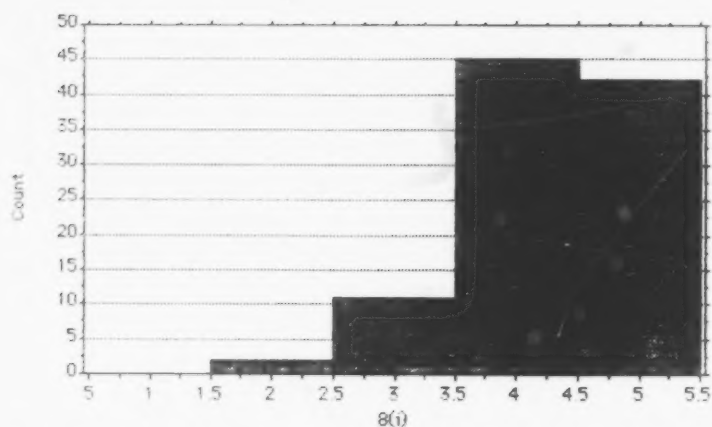
5. DISTANCE EDUCATION.

Continued interaction between colleges and students in year 2 and year 3 through distance education covering:

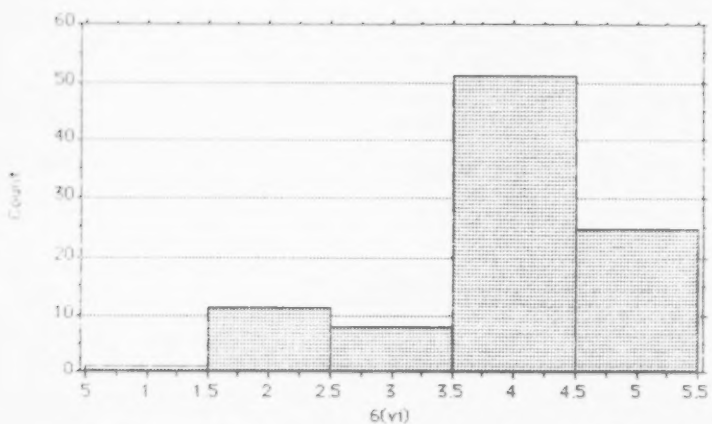
- a) theory
- b) applied methods
- c) Design and technology.

This is done through modules which the student will be required to take when he or she is leaving the college for teaching practice in schools. Fourth year students are required to carry out an individual depth study to be presented to college in 3rd term. Fourth years must also be required to do some linked distance education work to keep them up to date.

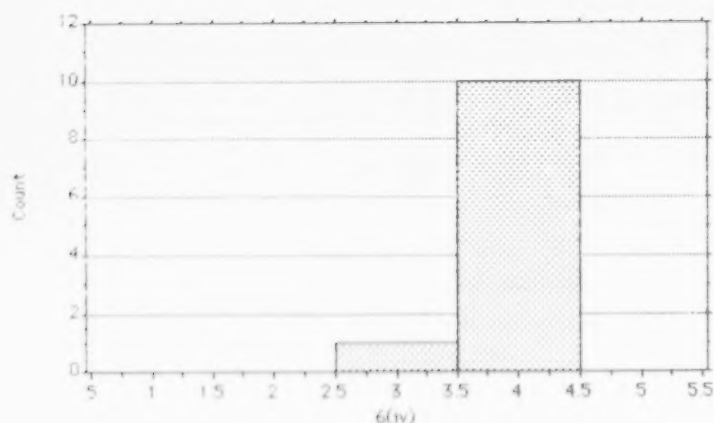
SW...



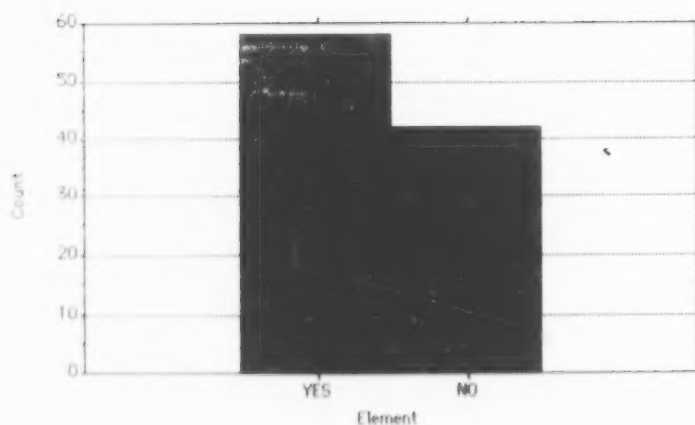
(a) Figure 20 : Frequency distribution on statement 8(i) item 8 - Questionnaire (A)



(b) Figure 21 : Frequency distribution on statement 6(vi) item 6 - Questionnaire (B).



(c) Figure 22 Frequency distribution on statement 6(iv) item 6 - Questionnaire (C)



(d) Figure 23 - First year students who did and, those who did not study technical/practical subjects at secondary school level.

TABLE 2 (Specimen table from STATVIEW data-base)

X ₁ : 8(i)					
Mean	Std. Dev.	Std. Error	Variance	Coef. Var. :	Count
4.27	.737	.074	.543	17.25	100
Minimum	Maximum	Range	Sum	Sum Squared	# Missing
2	5	3	427	1877	0

KEY	Std. Dev.	-	Standard Deviation	-	(abbreviation)
	Std. Error	-	Standard error	-	(abbreviation)
	Coef. Var.	-	Coefficient Variance	-	(abbreviation)
	Count	-	Number of questionnaires	-	(terminology)

Note

This specimen table extracted from Macintosh STATVIEW 512+TM data-base -[Questionnaire (A) statement 8 (i)], shows the descriptive statistics available.

The official letter that the researcher used to introduce himself at the university, Belvedere, C.D.U. and other places where it was necessary during the study.

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UNIVERSITY OF ZIMBABWE

14 November 1988

TO WHOM IT MAY CONCERN

Dear Sir/Madam

PETER KWAIRA is an M.A. Technical student who is visiting
your ^{INSTITUTION} ~~school/institute/centre~~ to carry out some research for the M.A.
degree he/she is studying at LINCOLN UNIVERSITY

Please assist ~~her~~/him. He is attached to the University of Zimbabwe at present.

S. NONDO

Acting Chairman, Curriculum Studies.